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NOTICES :—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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Power Alcohol

THE second memorandum issued by the Fuel Research Board on "Fuel for Motor Transport" supplies but little ground for any hope of the United Kingdom ever being able to produce its own liquid fuel from indigenous raw materials. The main factors against such a possibility are the large and increasing consumption of petrol—the imports for the first ten months of 1921 amounted to 216,077,424 gallons—and the fact that it is not possible to grow the necessary raw materials in sufficient quantities and at a sufficiently low price. After conducting fairly exhaustive inquiries and experiments, the Board have reached certain definite general conclusions. The first is that the prospect is remote of adding materially to the supplies of liquid fuel for internal combustion engines in this country by the manufacture of alcohol from home-grown materials. Secondly, the production within the Empire of alcohol from materials containing sugar or starch is only likely to be possible commercially in the near future in some of the

Dominions and Colonies, and then only on a sufficient scale to meet local requirements. In the opinion of the Board such production would be possible owing to (a) the availability of molasses, now a waste product in many places; (b) the possibility of growing vegetable substances giving a high yield per acre combined with a relatively high starch content, such as cassava, sweet potatoes, and yams; (c) the comparatively cheap labour and production costs; (d) the high cost and scarcity of other liquid fuels; and (e) the relatively small liquid fuel requirements. Thirdly, it is considered unlikely that alcohol could be produced in this manner in excess of local needs, and at a price, when freight to sea-board and to this country is included, at which it would find a market here.

Synthetic production on a commercial scale in this country is also dismissed as unlikely, though the Board consider it might be possible in Canada and Australia. As the report points out, the manufacture of calcium carbide requires electricity, and it can only be made commercially if hydro-electric power or very cheap fuel is available. Calcium carbide, and the substances acetylene and acetic acid obtained from it, have many applications in the arts and industries, and the carbide is itself used in the production of a valuable fertiliser. Demands for it and the price it commands for these many purposes make it improbable that it would be available within the Empire in sufficient quantities and at a sufficiently low price to make it a raw material for the production of cheap power alcohol. The one possible exception, in the opinion of the Board, is Australia, where the generation of cheap electricity on a large scale from the brown coal deposits in Victoria is engaging the attention of the Victorian Government. Canada also produces calcium carbide, the electricity being generated by means of water-power; but for the reasons given the Board see little prospect of Canadian carbide becoming a source of cheap power alcohol. Considerable attention has been given during the last two years to the possibility of removing ethylene from the gas produced in gasworks and coke ovens, and its subsequent conversion into power alcohol. A manufacturing scale process has not yet been developed, however, and even should a successful one be worked out, the Board consider it would still be a question whether it would be profitable so to produce alcohol at the expense of the calorific value of the coal gas.

In a previous memorandum it was pointed out that if a cheap and simple process, either chemical or bacteriological, were available and could be applied commercially on a very large scale, tropical and semi-tropical vegetation would afford a practically inexhaustible reservoir of power alcohol. Research work for such a process has, however, not yet reached a stage where its possible industrial application can be seriously considered, and the Board are doubtful whether a chemical process can be devised until more

definite knowledge of the constitution of cellulose is available. On the bacteriological side, however, some progress is reported. It has been established that cellulose can be broken down by certain readily accessible micro-organisms into glucose and cellobiose, but that these bodies are converted into other non-fermentable products as the action proceeds. Work is in progress to develop some modification of the reactions taking place, so as to fix the glucose and cellobiose as produced, as well as to select the most suitable organism for the purpose.

Facing the Truth

In a statement by Sir William Alexander published in this issue the present position of our trade in industrial chemicals and dyestuffs is reviewed with great thoroughness. It is distinguished by a quiet and reasoned confidence rather than by light-hearted optimism, but the confidence is conditional on our realisation of the task before the nation, and on our determination to carry it successfully through. If we are prepared to make the effort, Sir William Alexander believes, as we all do, that Great Britain's future is assured; but the absence of the necessary exertion may have grave industrial and commercial consequences. Everyone will be the better for being compelled to face the plain truth of the situation.

Dealing with the dyestuffs industry first, we are reminded of our original triumphs in this field of research; of our slackness in allowing the lead to pass to Germany, as the result of which she established a world monopoly; of the ruthless uses to which that monopoly was put; of the gigantic efforts this country made, and made successfully, to wipe off the handicap; of the great programmes which Great Britain and the United States laid down to make themselves for ever independent of German supplies. All this is now familiar knowledge; so familiar, in fact, that the moral of it all may easily be lost. The practical point it leads up to is this: as the result of recent developments the world's power to consume chemicals and dyestuffs is exceeded by the world's productive capacity. Where, then, must Great Britain look for the enlarged markets to correspond with her enlarged plants? The answer is—primarily within the Empire. There is no middle course in this matter. Great Britain must go forward to complete success or backward to complete and humiliating failure. To state such an issue is to make clear beyond all doubt the only policy possible for this country and to all who care for its future.

Passing to the more general problem of the reconstruction of Europe, Sir William offers a plain and needful warning against trusting to sham remedies. However great the demand, he points out, profitable and successful trading can only be conducted proportionately to the amount of cash and sound credit available. Paper money is illusive. Export credits and other schemes for the establishment of trade on long deferred credits are dismissed as "only lending encouragement to European countries to rush into debt for goods they cannot pay for." This, for the moment, may be a little chilling, but the recovery everyone is hoping for will be sounder and more permanent if we start from the very beginning to work

for it on sound lines. To quote Sir William's own words, "we shall retrieve our own prosperity more quickly and surely by concentrated development of trade within the Empire, adding such outside business as exhibits a fair commercial return, rather than retard reconstruction on normal lines by the encouragement of trading with insolvent nations against phantom credits, which contribute to extravagance, indolence, thriftlessness and inefficiency."

Chemistry in Private Houses

A WELL-KNOWN consulting technologist—one of those happy persons who, while protesting the proverbial poverty of the chemist, contrive somehow to build spacious tabernacles for themselves—was lamenting to us the other day the vexatious character of municipal by-laws in relation to pipes and sinks and other adjuncts of the laboratory. The case is not quite so isolated as might be supposed. In the new number of the *Journal* of the Institute of Chemistry it is stated that a consulting chemist, occupying a private house on a short lease and conducting part of his practice in a laboratory in the house, has been obliged to comply with an order of ejectment, owing to his landlord, who desired to sell the house, objecting to the conduct of a business on the premises. "The matter," it is added, "is of general interest to professional men, many of whom—practitioners in medicine, law, dentistry, architecture, surveying, accountancy, journalism—in varying degree, carry on their work at home." We cordially agree that the journalist earning his penny a line or composing sonnets never likely to earn anything, the barrister studying his first brief or anxiously wondering when it will arrive, and the architect engaged on plans that never materialise, may be quiet and desirable neighbours. The doctor, who wakes the street at 2 a.m. in trying to start an obstinate car, or the dentist, attracting a doleful procession of patients, may be more doubtful. The domestic chemist, however, especially if his tastes for experiment incline to high explosives or poison gases, might easily come to be regarded with real alarm. Hence the polite attentions of the borough surveyor.

In the case in point we gather that no objection had arisen with regard to the nature of the work, no inconvenience had been caused to neighbours, and no complaints had been made. The chemist was not disposed to appeal to the High Court, but obtained an extension of time (two months) to find other accommodation. The question which the High Court would have had to decide was whether the practice of chemistry is carrying on a business. In cases where chemists are already so practising they in all probability assume that the right of a professional man to practise at home is duly acknowledged, and—here we quote the delightfully artless suggestion of the Institute—"it would probably be indiscreet to raise the matter with their landlords." Further, "the question is worthy of note, as a warning to members who intend to conduct practice in similar circumstances to insure that their agreements do not debar them from doing so." Fellows and Associates who are aware of any case bearing on the question are invited to communicate with the Legal and Parliamentary Committee of the Institute.

Home-Produced Oil Enterprises

IN the early days of our existence—to be exact, in our issue of September 6, 1919—reference was made to a statement by Dr. Forbes Leslie to an extraordinary general meeting of English Oilfields, Ltd., a statement so full of the promise of prospective wealth that we were compelled to treat it with a certain amount of reserve. That this attitude was justified may be gathered from what occurred at a meeting of the same company held in London last week. Although two-and-a-half years have elapsed since Dr. Leslie's predictions, we find one of the directors of the undertaking lamenting that "notwithstanding the tremendous expenditure of £700,000, the shareholders would be amazed and grievously disappointed to know that no oil or other material to a commercial extent had been produced, and not one penny had been brought into the coffers of the company except by the sale of certain plant." Some degree of uncertainty has all along been felt as to the ultimate success of propositions for developing the home production of oil; and a survey of the fortunes of the many schemes put to a practical test during the past few years tends rather to increase than to diminish it.

For instance, towards the end of last year it was announced that the several wells in Derbyshire which had failed to yield oil were to be plugged, while the Staffordshire well at Apedale was also abandoned. In fact, only two borings were continued by the Government through its petroleum managers, namely, those at Werrington in North Staffordshire and at D'Arcy in Scotland. At the West Calder well in Scotland, boring was suspended some time ago, the well having reached a depth of some 4,000 ft., but in this case there was some prospect of experiments being recommenced. Again, the famous Hardstoft boring does not seem to have met with the success expected, and little is now heard of it. From the above particulars it should not be difficult to form an opinion as to the home oil-production enterprises; and, although the trials conducted are, from some points of view, commendable enterprises and have not been without value, further expenditure on similar experiments would seem to be highly speculative.

Canadian Home Rule

As the result of the recent visit of the Society of Chemical Industry, Canada is putting forth a demand for chemical home rule. A new impetus, we learn, has followed the annual meeting; there have been enthusiastic branch meetings; a fine season is ahead of the society in the Dominion. In the severely literary language of Colonial writers "there is one cog missing, or rather not yet placed where it belongs." In less parabolical terms, Canada wants an overhead council, consisting of local chairmen and secretaries and a central chairman and secretary. Moreover—and this is the only really alarming point in the scheme—Canada will require "a permanent paid secretary" whose business it will be to keep the local branches working and growing all the time. Very truly it is contended that there are many things the society can do specially for Canada which may not be of interest to the society as a whole; so, without making any immediate demand, the plea is put forward that Canada should bear to the mother society the relation it bears politically to the mother country. In a word, chemical home rule for Canada within the society.

Points from Our News Pages

- Sir William Alexander, in the first of a series of monthly interviews, discusses the position and prospects of the industrial chemicals and dyestuffs industries in this country (pp. 4-6).
- The first of a series of articles by Dr. Stephen Miall deals with "The Structure of the Atom" (p. 7).
- Correspondence is published relating to "Bentonite" (Osmosis Co., Ltd., and F. Ruston Ablett) (p. 6) and "Santonine" (S. N. Brown, F.C.S.) (p. 8).
- Reference is made by Aikman (London), Ltd., in the annual review of the nitrate industry, to new extraction processes which will, it is thought, materially reduce production costs (p. 9).
- At a meeting of shareholders it was announced that the working of the experimental plant at Barnsley of Low Temperature Carbonisation, Ltd., had been in every way satisfactory (p. 10).
- The inquiry into the protection of British glassware under Part II. of the Safeguarding of Industries Act was resumed on Tuesday and Wednesday, and adjourned until January 10 (p. 11).
- According to our London Market Report the demand for most chemicals has fallen flat, but a substantial improvement is looked for during the early part of this month (pp. 17-18).
- In the report on the Scottish Chemical Market, a new feature contributed by Charles Tennant & Co., Ltd., it is stated that the New Year has opened with signs of improving home trade (p. 19).

Books Received

- BLEACHING AND RELATED PROCESSES. By J. Merritt Matthews. New York: The Chemical Catalog Co. Pp. 676. \$8 net.
- PROCEEDINGS OF THE ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA. Pittsburgh: Union Arcade Building. Pp. 47.
- THE SWEDISH YEAR BOOK, 1921. Stockholm: A.-B. Svenska Teknologföreningens Förlag. London: Williams & Norgate. Pp. 170. 7s. 6d. net.
- THE SCIENTIST'S REFERENCE BOOK AND DIARY FOR 1922. Manchester: Jas. Woolley, Sons & Co., Ltd. 3s. 6d. net.
- AN INTRODUCTION TO THE PHYSICS AND CHEMISTRY OF COLLOIDS. By Emil Hatschek. London: J. & A. Churchill. Pp. 172. 7s. 6d. net.
- A COURSE OF PRACTICAL ORGANIC CHEMISTRY. By T. S. Price and D. F. Twiss. London: Longmans, Green & Co. Pp. 238. 6s. 6d. net.

The Calendar

Jan.		
10	Institution of Petroleum Technologists: "An Investigation into the Physico-Chemical Significance of Flash Point Temperatures." Dr. W. R. Ormandy. 5.30 p.m.	Royal Society of Arts, John Street, London.
12	Oil and Colour Chemists' Association: "Super Centrifugal Force and its Application to the Clarification of Varnish and the Dehydration of Oil," A. H. Keable. 7.30 p.m.	The Food Reform Club, 2, Fumival Street, London.
12	Society of Chemical Industry, Glasgow Section: "The Teaching of Chemistry." Professor R. M. Caven. 7.15 p.m.	The Engineers' and Shipbuilders' Institute, 39, Elmbank Crescent, Glasgow.
12	Society of Dyers and Colourists, Bradford Junior Branch: "Vat Dyes." N. Evans.	Bradford.
16	Chemical Industry Club: "What is a Fine Chemical?" W. J. U. Woolcock, M.P.	2 Whitehall Place, London.
17	Hull Chemical and Engineering Society: "Modern Electricity Supply." H. Bell. 7.30 p.m.	Wilberforce Café, Waterworks Street, Hull.

Leaders of Chemical Industry

1.—Brigadier-General Sir William Alexander, K.B.E., C.B., D.S.O.

It would be easy, if the occasion required, to say much about the national and commercial work of Brigadier-General Sir William Alexander, managing director of Charles Tennant & Co., Ltd., of Glasgow, and chairman of the British Dyestuffs Corporation, Ltd., and those who know it best could speak with most conviction. But there is a certain type of mind and character which is its own best witness, and, besides, in this case there is a Scottish tradition of reserve not to be ignored. Only the briefest note of introduction is needed, therefore, respecting the first of the "Leaders of Chemical Industry" to be noticed in this series of monthly interviews.

Born in 1874, the son of the late Thomas Alexander, of Brentham Park, Stirling, Sir William Alexander was educated at Kelvinside Academy, Glasgow University, and Göttingen. He passed in due course into the chemical works of Charles Tennant & Co., at St. Rollox, Glasgow, where the foundation was laid of his thorough knowledge of chemical manufacture and engineering, to be followed later by commercial and administrative responsibilities of an uncommon order. Already an officer in the Territorial Force, in which he held a commission as early as 1899, he served in France with the Black Watch in the early days of the war, but in 1916 was recalled in order that his technical and administrative experience might be specially applied to the vital problem of munition production. As Director of Administration of National Explosives Factories, he had control of over twenty establishments, including the immense works at Gretna for propellants and at Queen's Ferry for high explosives. So satisfactorily had output overtaken demand by June of the following year that Sir William could then be spared to undertake the Controllorship of Aircraft Supply and Production—a field in which the same vital problem of increased production had become equally urgent. Here, again, within a year an enormously increased output had given Great Britain supremacy in the air, and the second phase of his special work completed, Sir William passed to the post of Director-General of Purchases and Supply to the Ministry of Munitions, with responsibility for the vast requirements of the military and air forces. Of the vital relation of such work to the success of the Allies and of the force of mind and character it called for this is not the time to speak. The simplest testimony to it may be found in the distinctions of D.S.O. (1916), C.M.G. (1918), C.B. (1919), K.B.E. (1920), with the rank of Brigadier-General, conferred on him by his own country, and in such foreign decorations as the Legion of Honour and Officer of St. Maurice and St. Lazarus.

Sir William Alexander is now back again in commercial life, but the lessons of the war have sunk into his mind,

and left him convinced that British industry—and especially chemical industry—can only be saved by the same sustained effort and invincible spirit which won the war. Only recently returned from a tour of Canada and the United States, closely concerned with the future of the dyestuffs industry, he is even more than usually qualified to take a wide comparative view of the international trade situation, and especially of British industrial problems in relation to those of other nations, and we are indebted to him for the following typically direct and thorough review of the present position:

1921 and 1922

"Few, if any," he said, "of those occupied in the control and administration of industrial concerns will shed tears over the passing of 1921. For manufacturers, especially, committed to heavy overhead charges and running expenses, and responsible for the employment of masses of wage-earners, it has been a year of apprehension and anxiety. Following on a short post-war boom of exceedingly speculative trade and production, stimulated by over-confidence, extravagance, and artificial credits beyond the limits of sound finance, the first whisper in the autumn of 1920 of insolvency on the part of nations and firms accelerated the rapid development of financial mistrust, commercial stagnation, and all the evils which automatically follow in such a trail.

"1922 opens with little more tangible than the pious hope of a change for the better, but it is to be expected that the drastic medicine administered under the force of critical circumstances will shortly effect a slow but sure cure, even in spite of the prevailing world adverse economic conditions.

"Money which should to-day be employed in industry is accumulating in vast sums on deposit in the banks, a very unhealthy sign, and will not be rectified until confidence is restored.

Industrial Chemicals and Dyestuffs

"Chemicals, to a greater or lesser extent, and at one stage or another, enter into the production of almost every class of manufactured commodities, and for this reason the chemical market has been designated the barometer of general trade. Similarly the demand for dyestuffs gives a good indication of the prosperity or otherwise of that very large and important group of British industries falling under the classification of 'Textiles.'

"These two groups, Chemicals and Dyestuffs, are very closely associated and form two of the most important and valuable key industries which a nation can possess. They ought to be vigorously developed and closely guarded. Their importance was early recognised by Germany, where they are amalgamated and run by that powerful organisation the 'Interessen Gemeinschaft,' with a total capital of over



Photograph by Mareau.

BRIGADIER-GENERAL SIR WILLIAM ALEXANDER.

2,000,000,000 marks, nominally £100,000,000. The chemicals and dyestuffs plant of this huge organisation proved an asset to Germany in the late war, for propellants, high explosives, poison gases, &c., which was invaluable, and gave to her in the critical stages a predominant possession of supplies for which Britain was starving.

"Recently a similar organisation has been established in America, combining heavy chemicals, coal tar products, and dyestuffs, under the control of 'The Allied Chemical and Dye Corporation,' and a recent visit to America convinced me that there is in America a determined post-war policy—shared alike by producers and consumers—to protect American home industries, especially chemicals and dyestuffs.

Lessons from the Past

"A short review of the past history of British interests in these two groups, with a few suggestions for their future, may be interesting and instructive. Great Britain was largely responsible for the origin, utilisation, and development of chemicals and dyestuffs for industrial purposes, and the discovery of dyes extraction from coal tar—which revolutionised the art of dyeing—stands to the credit of a British scientist. Although she built up and maintained, in spite of foreign competition and against protective tariffs abroad, a large and creditable chemical manufacturing industry, Britain utterly failed to realise the prospective value of dye-making by following up her own discoveries and developing in practice an industry in which she held an unique advantage as far as raw materials were concerned.

"Consequently, prior to the war Germany had been presented with practically a world monopoly of a very great and profitable industry, having a direct trade of about 135,000 tons per annum out of a total world's consumption of about 160,000 tons, and giving direct and indirect employment to hundreds of thousands of persons, and livelihood to probably four times the number. If to these figures are added those employed in the outside German chemical industries the numbers will be very substantially greater.

"Let us now investigate the influence of established German chemical and dyestuffs plant from the moment war was declared. Germany was enabled to switch over from peace-time production chemical plant to the output of propellant components and high explosives, subject only to extensions to meet increased demand, and dyestuffs plant to those new and deadly effective weapons of war included in poison and toxic gases. British chemical plants, fortunately existing, were also promptly adapted to the production of propellants and the older classes of warfare munitions covered by nitro-cellulose compounds, whilst necessary additions and extensions were put in hand.

"Trench warfare, however, soon called for high explosives such as T.N.T., picric acid, ammonal, &c., and later for poison gases, and the absence of dyestuff plants in this country and experience in mass production was a serious handicap. No alternative existed but to design and construct plant and train chemists and engineers to deliver the goods from such plants as were erected at Gretna, Queen's Ferry, Huddersfield, Blackley, and elsewhere.

"During the construction and equipment of plants in this country it became essential to purchase in America vast quantities of propellants and high explosives at high premiums and against credits which drained the country of its gold reserves and negotiable securities. It should be noted, however, that once the country had installed the facilities, the results obtained from the operation of plants—many of them entirely novel—under British chemists and engineers were not surpassed in efficiencies by any other nation, Germany included. This fact ought to be borne in mind when we are discussing the maintenance and operation of the plants now existing for peace-time production.

World's Increased Output Capacity

"As in our own case, other countries—notably America, Japan, Italy, France, and Germany—find themselves with new or largely extended capacity for chemicals and dyestuffs, so that to-day the world's power to consume these commodities is far below the world's capacity to produce, and Great Britain itself has facilities for supplying at least the entire requirements of the British Empire.

"Is there any reason why she should not have this trade? As a result of war expenditure it may be estimated that the following capacities for dyestuffs exist in up-to-date plant:

U.S.A.	32,000	tons	per	annum
Great Britain	30,000	"	"	"
Switzerland	12,000	"	"	"
France	8,000	"	"	"
Other countries	4,000	"	"	"

a total of 86,000 tons per annum, exclusive of Germany, whose pre-war trade was 135,000 tons and whose capacity is now much greater. Although such surplus capacity may mean a peace-time war of elimination, have not these two solvent nations, Great Britain and America, every chance of pulling through when they are uniquely and satisfactorily placed for all the raw materials, if application and determination be added?

"I will admit that in the past concentrated effort on the part of Germany has left us behind, but I have yet to learn that the quality of German brains is superior to that of our own scientists, chemists, engineers, and wage earners. Neither in the interest of national security for the future nor in the interests of the commercial prosperity of the Empire can we allow these new and extended installations, capable of employing so many citizens, to become derelict. We have the power to maintain these plants in operation for the benefit of the nation—

(1) If British Empire consumers will support their own Empire industries in the same sympathetic spirit shown by Australasia, for example.

(2) If British chemists and engineers responsible for running plants will concentrate with determination towards maximum efficiency.

(3) If British labour will recognise that maximum production per unit of labour or plant is the greatest security for regular and good wages and low cost of living.

(4) If the British Government will continue to assist British industries to fight against depreciated currencies and other handicaps to fair trading on equitable terms.

(5) And if the British Government will realise that its Consuls and Trade Commissioners overseas should be competent, commercially, to pioneer, advertise, and assist in the development of British trade.

Government Assistance

"Reference to British Government assistance compels one to comment on past efforts and methods. Government Acts and forms of legislation should be communicated in definite and simple language and clear to the understanding of those called upon to conform to the provisions. This has not been the practice, and Acts are so ambiguous and indefinite in wording that only 'wizards' could be expected to interpret the intentions. Consequently exasperation, irritation, and lengthy litigation are often the immediate result.

"Let us analyse only two typical cases affecting the particular industries under review. The Royal Proclamation of 1919 dealing with the Importation of Foreign Dyestuffs was wrongly drawn, having regard to the law, and its illegal nature having been made clear by the Sankey judgment, this new industry was left for twelve months at the mercy of German dumping, to the serious financial prejudice of an industry which the British Government had committed itself to protect. More recently, one follows with regret the numerous and contentious discussions arising out of the nebulous, academic, but non-commercial clauses

of the Key Industries Act, involving lengthy and costly arbitration, as to what constitutes 'a synthetic organic chemical.'

"Key industries should surely be more simply definable than by meticulous class and scientific descriptions always open to argument. Does not the title indicate as 'Key Industries' those productions for which the country is advantageously placed from the point of view of raw and semi-manufactured materials, for which she possesses the requisite efficient plant and knowledge, and which will employ British labour and yield in return commodities at such prices as will inflict no hardship nor put out of business those who are consumers?"

"If we can realise these aspirations there is no reason for despondency as to the future welfare of the chemical and dyestuffs industry, or, in fact, any large industry where good facilities are available.

Reconstruction of Europe

"The trade slump of 1921 has shaken confidence to its foundations. It is to be hoped that a beneficial lesson has been taught as a result of the wild speculation and gambling of 1910-1921, namely, that, however great the demand, profitable and successful trading can only be conducted proportionately to the amount of cash or sound credit available. Printing presses, working overtime on paper notes to stave off liquidation, are a disastrous method of raising credit, and sooner or later lead to commercial chaos and bankruptcy.

"The reconstruction of Europe—many of whose nations were our largest customers in pre-war days—is all-important to Great Britain as an exporting nation, and no opportunity on the part of such solvent countries as Great Britain and America to assist in reconstruction on sound lines to the extent of such finance as can be safely extended should be missed, but the greatest and most enduring assistance will be in the direction of encouraging poor nations to help themselves. Nations whose currencies have fallen so low as to have little or no purchasing values will require to go hungry until they reorganise their internal economies and industries by producing or taking out of the ground the equivalent of currency to balance imports by exports.

"For an example of this theory one has only to study what has already been achieved by such a small country as Czecho-Slovakia, where determination, energy, and level-headed administration by shrewd commercial brains have placed her and her credit in a position to-day which must be the envy of other nations with far greater national resources and opportunities. Such a policy is the only permanent and reliable method of stabilising exchanges. Export credits and other schemes introduced for the establishment of trade on long-deferred credits are only lending encouragement to European countries to rush into debt for goods they cannot pay for.

"It may be said that this doctrine carries little encouragement towards a speedy revival of trade in Great Britain, which lives to a very large extent upon her exports. True, but the obvious reply is that in our present state of reduced circumstances we must not trade beyond our means and cannot afford, however driven, to give unlimited or hazardous credit. We shall retrieve our own prosperity more quickly and surely by concentrated development of trade within the Empire, adding such outside business as exhibits a fair commercial risk, rather than retard reconstruction on normal lines by the encouragement of trading with insolvent nations against phantom credits, which contribute to extravagance, indolence, thriftlessness, and inefficiency.

"America has recovered from the general depression to a greater degree than any other nation because about 80 per cent. of her trade is within her own boundaries, because she has nursed and protected her industries, and consequently the rapid circulation of dollars within the country acts as a potent stimulant to production and employment.

"Prior to the war Great Britain was increasingly living as merchants for the distribution of the products of other nations. The aftermath of war has enormously extended capacity in almost every class of manufacturing equipment, and past conditions have been completely altered by similar extensions in other countries. In the peace-time war for commercial supremacy there will be no room for middlemen. Let us make certain that we do not drift into a position of being neither producers nor merchants.

A Gradual, not Spasmodic, Recovery

"Best interests will be served by a trade recovery that is gradual and not spasmodic. The interregnum of restricted trade should be utilised to the fullest extent in perfecting plant, processes, and production efficiencies for all classes of manufactures for which the country is advantageously placed. Chemicals and dyestuffs, with unlimited sources of coal and coal tar products, limestone, salt, &c., should form two of the most extensive. When reconstruction and re-establishment of confidence bring demand we should then be in a position to command a fair share of the world's trade against any fair competition.

"I cannot close without drawing attention to two fundamental services which go to the very root of cheap production, viz., cheap coal and cheap transport.

"Coal is a national asset, and consumers have a right to demand that home requirements will be served first, and, further, that industrial demands, at least, will have supplies at minimum prices and never higher at the pit mouth than those prices which are accepted in the same position for export.

"Railway rates, coastwise traffic rates, and overseas freights are still in excess of what they should be, and unless they are materially reduced will certainly operate very adversely in the future against British industrial development.

"Consultation between manufacturers and close co-operation between employers and employed should be encouraged to the utmost, with the object of obtaining maximum output, from a minimum of plant, at minimum cost, and also that we may compete for world trade more collectively as a nation and less as isolated members with no common interests."

Bentonite

To the Editor of THE CHEMICAL AGE.

SIR,—We were much interested in reading the article in your paper on "Bentonite," as this company has had occasion to examine the material with a view to purifying it.

Bentonite is a very fine clay substance in the form of a gel containing varying amounts of gritty material which require to be removed before the material can be utilised as a filler.

Owing to the presence of much adsorbed alkali it is not possible by ordinary means to disperse the clay matter and allow the impurities to settle.

The Osmosis Co. has experimented in devising means to separate the gritty material, and the results obtained were promising and might be of interest to users of Bentonite.—Yours, &c.,

THE OSMOSIS CO., LTD.

London, January 2.

To the Editor of THE CHEMICAL AGE.

SIR,—In view of the article on "Bentonite" in the current number of THE CHEMICAL AGE, your readers may be interested to know that I am handling this product for the producers and will be glad to submit samples and prices to prospective buyers.—Yours, &c.,

F. RUSHTON ABLETT.

20, Bucklersbury, E.C. 4, January 2.

International Greetings

THE Editor of THE CHEMICAL AGE, together with a number of other British journalists, has received the following New Year message sent in the name of the American Trade Journalists' party who visited this country during 1918: "With all sincerity we extend good wishes and holiday greetings to our British brothers, and express what we believe to be a mutual national hope that success may rest upon the banners of the English-speaking peoples in their united efforts toward everlasting 'peace on earth, goodwill toward men.'"

Notes on Some Recent Chemical Theories

I.—The Structure of the Atom

By Dr. Stephen Miall

It is a sign of a certain maturity to be able to remember the great chemical discoveries of 1894, 1895, and 1896. I do not mean that such a memory is evidence of middle age—far from it. Most of us who were acquainted with chemistry before the inert gases were discovered are still young, but we are gradually losing our youth, innocence, and beauty. The inert gases and radio-active elements are closely connected, and they have opened our eyes to the nature of elements and atoms. THE CHEMICAL AGE has been good enough to allow the recent work on these subjects to be described in its columns, and this first article will probably be followed by others.

In 1894 the late Lord Rayleigh announced that the air contained a new gas. He had noticed that the nitrogen of the air was slightly denser than nitrogen prepared by other methods, and he repeated Cavendish's experiment of passing electric sparks over a mixture of oxygen and nitrogen in contact with potash in a U tube and found, as Cavendish had done, that a small proportion—Cavendish said not more than $\frac{1}{100}$ th—of the nitrogen of the air could not be converted in this way into nitric acid. He secured the co-operation of Sir William Ramsay. They repeated the experiments with all the improvements which modern science could suggest, and early in 1895 they demonstrated the existence of a new element, which they called argon, and described its properties, the most singular of which is that it has no power of forming chemical compounds; that is, it has no chemical activity or chemical properties. This very startling discovery was speedily followed by another.

Ramsay, in the winter of 1894-5, was eager to discover fresh sources of argon, and was advised to examine a sort of pitch-blende from which Hillebrand had, some six years previously, prepared a gas supposed to be nitrogen. Ramsay prepared the gas and found that in addition to a certain amount of argon the gas contained a new element, helium, the spectrum of which had been known from solar observations since 1868. Helium was soon found to be, like argon, a gas with no chemical activity.

While these researches were being conducted in England other discoveries were being made on the Continent, of which the discovery of X-rays by Professor Röntgen of Wurzburg in 1895 is the most significant from our point of view. It had long been known that when an electric discharge takes place in highly exhausted tubes containing a little gas, brilliant colour effects are produced, and the late Sir William Crookes spent much time and used his great genius in describing and interpreting the discharge from the cathode or negative electrode. When this discharge, the so-called cathode ray, strikes against a solid a new radiation is produced. This radiation is the X-ray or Röntgen ray, and its chief characteristic is its power of passing through flesh, paper, wood, aluminium, and many other substances. The X-rays have a photographic action and are able in certain circumstances to make air and other gases conductors of electricity to a limited and temporary extent.

A few months after the discovery of X-rays Professor Becquerel of Paris, who was working at phosphorescence and the radiating properties of uranium compounds, found out that uranium compounds gave off some sort of radiation with photographic properties, and that this radiation, like X-rays, had a certain power of making gases conductors of electricity. The discovery of X-rays and the activity of uranium compounds naturally excited the attention of physicists as well as chemists. Sir Joseph Thomson made a thorough investigation of cathode rays, and it was found that the cathode emits particles of an extremely minute size, far smaller than molecules or atoms, having a mass of about $\frac{1}{1800}$ of the mass of a hydrogen atom. It seems

that, whatever the nature of the gas or of the cathode, the cathode rays are similar in properties, and they have been called electrons, and are believed to contain—or to be—the smallest quantity of negative electricity that can exist. These electrons striking against a solid body produce the X-rays of Röntgen, and they are the first stage in the modern development of our ideas of the atom.

It seemed to some chemists that the radio-activity of uranium was a promising field for fresh discoveries, and Professor and Madame Curie gradually traced the cause of the activity of pitch-blende, a naturally occurring uranium mineral, and discovered two new elements, radium and polonium, which are associated with uranium in all the compounds which occur as minerals. These elements were discovered in 1898, but as the quantities available were very minute the properties of the metals and their compounds were only gradually studied during a period of several years. In 1898 Madame Curie discovered the radio-activity of thorium, which was independently discovered by Schmidt in the same year, and in the following year the radio-active element actinium was discovered by Debierne.

A mere string of names and dates gives a very imperfect idea of the new elements, and it is necessary to consider their habits rather more minutely. Let us take the case of radium first. Radium metal and all its compounds are found to be continually giving off what are termed rays and also an emanation. The rays or radiations directly or indirectly caused by radium are of three kinds—alpha rays, beta rays, and gamma rays. Of the total amount of radiation about 90 per cent. is due to the α rays, and these are therefore of primary importance. It was suggested by Professors Rutherford and Soddy in 1902 that the rays might be helium originated by the breaking up of the radium atom, and it was not long after that this was proved beyond all reasonable doubt by Sir William Ramsay and Professor Soddy. These rays are indeed atoms of helium charged with positive electricity; they travel for a short distance through the air and are readily stopped by a piece of paper or metal foil. The β rays were proved by Rutherford to consist of cathode rays or electrons travelling at a velocity nearly as great as that of light, and the γ rays are radiations originated by the β rays in exactly the same manner that the X-rays (Röntgen rays) are produced.

The emanation given off by radium was first noticed by Dorn in 1900; it is a heavy gas which is chemically inert, but extremely active from the point of view of radiation. It has been weighed and its atomic weight determined, and it consists of the element niton, one of the inert gases. This element itself is continually undergoing change, just as radium is, but very much more rapidly. Radium is constantly, every year, losing a certain percentage of the radium present at the commencement of the year. It never passes quite into nothingness, and it is believed that about half any quantity disappears in about a couple of thousand years. The emanation or niton on the other hand loses half its quantity in less than four days. It gives off α rays and forms a radio-active solid, which after some vicissitudes of fortune turns into the element polonium, already referred to as having been discovered by Madame Curie.

Since that date the number of radio-active elements that are known to exist has very much increased, and it is now possible to trace their relationships in detail. But radium may be taken as a type, and we have to consider how these discoveries must alter our conception of the atom. The old idea of a minute particle, indestructible and unalterable, not occupying the whole space, but only a fraction of solids, liquids, and gases, is an ancient conception expounded by Lucretius in immortal verse a couple of thousand years ago,

and not even original in his day. Few and weary would be the readers of this article if I attempted to trace the history of this conception to date. Dalton, Lavoisier, Clerk Maxwell and the others had predecessors. But since the time of Professors Curie, Ramsay, and Crookes, now no longer with us, the history is manageable. It is obvious that if radium compounds of all kinds can give off electrons and helium and produce another transitory element itself capable of similar changes, at any rate some atoms, if not all, must contain both electrons and the stuff of which helium is made.

Sir Joseph Thomson showed in the early years of the twentieth century that electrons, or small quantities of negative electricity, in the vicinity of a positive charge would tend to arrange themselves round the positive charge in concentric rings or spheres, and Geiger and Marsden showed in 1909 that the main mass of the atom was concentrated in one very minute particle, so that we were forced to consider the atom as one heavy and minute nucleus with electrons at some little distance disposing of themselves in concentric rings or spheres. Chemical activity and electricity have long been known to be closely allied, and Thomson, Rutherford, and others suggested that the chemical activity of an atom depended on the number of electrons in the outermost sphere. Barkla showed in 1911, by studying the scattering of α -rays, that the total number of electrons was about half the atomic weight, and Van den Broek in the same year suggested that the positive electrical charge on the nucleus, which in the case of stable elements is equal to the number of negative electrons, gradually increased by the number 1 as the elements, commencing with hydrogen, could be traced along the periodic table. This suggestion was shown to be probably true by the researches of Moseley, whose brilliant career was terminated by his untimely death in Gallipoli during the late war. Moseley investigated what are known as the X-ray spectra of elements.

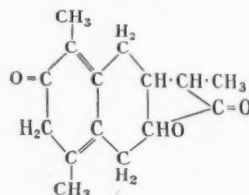
We have already seen that cathode rays or electrons, when they impinge upon a solid body, produce a new radiation called the X-ray. When the elements are exposed to X-rays in suitable circumstances a new type of radiation characteristic of each element is produced, as shown by Barkla, and this new radiation is of certain definite wave lengths which may be measured spectroscopically. Barkla showed that many of the elements gave two distinct sorts of radiation when exposed to X-rays, and these have been called the K series and the L series. Of these the K series is the more penetrating and has a much higher frequency. Since then a third and yet feebler radiation, the M series, has been discovered in the elements of high atomic weight. Moseley worked out the mathematical relationship of the K series of spectra and also that of the L series, and found that the lines which form the K series of spectra for each element have frequencies whose square root is directly proportional to the number of the place in the series of elements which the element in question occupies. This number, called the atomic number, is got by starting with hydrogen as 1, then taking helium as 2, lithium as 3, and so on right through the periodic table of all the elements. The square root of the frequencies in the L series of spectra is also proportional to the atomic number, and subsequent work has shown that a similar relationship can be traced in the M series.

It is obvious that this extremely important discovery enables us to know how many elements are missing in the periodic table, where the missing ones ought to be and so on. The rare earth elements can now be arranged in some accurate order and we can say how many of them there are. It seems now to be generally accepted that the atomic numbers represent not only the order of the elements, but also the number of positive charges of electricity attached to each element; that is to say, the element whose atomic number is 50 will have 50 positive charges of electricity. With the exception of the radio-active elements, which are in a state of flux, the number of positive charges of electricity for each element is the same as the number of electrons or charges of negative electricity.

The Chemistry of Santonine

To the Editor of THE CHEMICAL AGE.

SIR,—A great deal of interest has been created recently by the controversy as to whether santonine should be regarded as a drug or as a chemical within the meaning of Part I. of the Safeguarding of Industries Act. The following are a few notes on the properties of this product. Santonine is a substance of a peculiar lactone-like composition with the empirical formula $C_{15}H_{18}O_3$. It is stated to be constituted as follows,



i.e., a lactone of santoninic acid and a derivative of naphthalene. It has a specific action on ascarides and lumbricoids. On this account santonine has become an important remedy for the expulsion of worms, and the ground drug santonica (True Levant Wormseed), which contains santonine, is extensively employed in stock remedies. A great deal of santonica contains very little santonine, and

the drug as imported contains from nil to 3.5 per cent. Santonine is taken either alone or in combination with calomel or podophylline or both.

Santonine crystallises from alcohol in pearly crystals m.p. 172°C . It dissolves in chloroform, and the solution on evaporation leaves a syrup which crystallises in feathery groups. On heating it sublimes, and exposure to sunlight turns it yellow. It is slightly soluble in cold water, more so in hot. It is fairly soluble in cold alcohol and ether, and very soluble in hot chloroform and boiling alcohol. It is completely removed from an acid mixture with chloroform. It dissolves in alkalies, but the solution cannot be titrated for santonine. It is strongly laevo-rotary (α) $d-173.8$ for alcohol and 171.4 for chloroform. The solutions are not precipitated by ordinary alkaloidal precipitants, and are neutral to litmus. The solid substance gives characteristic colour tests. It dissolves in concentrated sulphuric acids solution with a yellow colour, the crystals giving violet rings where the acid acts on them. If the latter solution is diluted and ferric chloride added a violet solution is obtained. Nitric acid itself has no characteristic action. On evaporation and addition of alcoholic potash an intense orange colour is obtained. Santonine gives a red colour with alcoholic potash. Santonine has the property of so affecting vision that everything appears yellow.

There are various methods of preparation from the santonica shrub. Calloud's method is as follows: santonica is extracted with lime and water, and santonine slowly precipitated after concentration and acidification. It is purified by washing with water and diluted ammonia, and by treatment with animal charcoal, and finally recrystallised from alcohol. The latter operation has to be effected in a dark place, otherwise the product is affected by actinic rays and gives a yellow compound.—Yours, &c.,

S. N. BROWN, F.C.S.

Broughton Analytical Laboratories,
Manchester, December 30.

Santonine in India

Satisfactory Results on Laboratory Scale

IN view of the suggestion made recently that it might be possible to produce our requirements of Santonine within the British Empire, a note by Mr. J. L. Simonsen in the *Journal of Indian Industries and Labour* is of considerable interest. After stating that the Santonine occurs in the young flower-heads of *artemesia maritima*, and that until the war practically the whole of the world's supply came from Russian Turkestan, the author estimates that the industry must have been fairly large, as in 1885 one factory alone dealt with 1,600 tons of the flower-heads. At that date there were apparently at least two other factories, but no information is available as to the output. The industry was conducted in a somewhat primitive fashion, the plants being pulled by the local inhabitants, who stripped off the flower-heads and used the remainder of the plant as fuel.

Although it had been known for some time that the plant occurred in Kashmir and Garhwal, no systematic survey had been made of the quantity available. As a result of a series of tests carried out at the Forest Research Institute, Dehra Dun, with flower-heads collected in Kashmir, it was found that

artemesia maritima grown in that district contained an appreciable quantity of Santonine, ranging from .5 to 1.0 per cent.; the Santonine content of the Russian material is said to be between 1.8 and 2 per cent.

The method of extraction adopted at Dehra Dun was made to approximate as closely as possible to that which would be adopted on the large scale, and only the pure Santonine was weighed. A botanical examination of the specimens extracted at Dehra Dun has shown that the majority of the specimens consisted almost entirely of leaves, the flower-heads being only markedly developed in a sample collected in October, 1920. Since Santonine has not been noted previously as occurring in the leaves, it will be a matter of some interest to determine whether other parts of the plant contain Santonine. Up to the present only the stems have been tested, with negative results.

In conclusion, the writer expresses the opinion that *artemesia maritima* grown in Kashmir contains Santonine in sufficient quantity for remunerative extraction, and from the information available there would appear to be sufficient supplies of the raw material, and that it now only remains for the laboratory results to be utilised on the large scale. The method of extraction is comparatively simple, and the only chemicals required are lime, hydrochloric acid and alcohol, all of which are readily obtainable in India. As the leaves are bulky, it is suggested that the factory should, if possible, be situated in Kashmir.

Nitrate Industry in 1921

A Critical Period

IN their annual report on nitrate of soda, Aikman (London), Ltd., state that the large stocks in Europe left in the hands of the Pool at the end of June have only been slightly reduced during the past six months, but the prospects of an improvement in the coming season are fairly favourable, and it is not unreasonable to hope that the stocks in dealers' hands, and arranged for, in Europe, will be liquidated during the next six months. Of the present Chilean stocks of 1,441,000 tons it is estimated that 150,000 tons (including sales by the German companies and estimated production of the American companies up to June 30, 1922) have been sold for shipment during the next six months. Of these sales it is estimated that about 50,000 tons will be shipped to Europe and Egypt, 70,000 tons to the United States, and 30,000 tons to other countries during the next six months. On this basis the total supply available in these markets during the consuming season (including the present stocks and afloat) would amount to about 945,000 tons for Europe, 330,000 tons for the United States, and 50,000 tons for other countries. On the basis of last year's consumption of 1,429,000 tons for the world this would mean further deliveries in all countries for January-June, 1922, of about 1,090,000 tons, and leave stocks and afloat at the end of June of about 235,000 tons for all consuming countries, as compared with a normal figure of about 300,000 tons. It will thus be seen, the report states, that to provide normal stocks at June 30, 1922, and any increased consumption there may be, will necessitate fresh purchases from the Producers' Association.

The following is a comparison of production and other figures for the six months ended December 31, 1913, 1919, 1920, and 1921, and the nitrate years ended June 30, 1914, 1920, and 1921:

	1913-14 Tons.	1919-20 Tons.	1920-21 Tons.	1921-22 Tons.
Production in Chile for six months to December 31.....	1,367,000	744,000	1,302,000	451,000
Production in Chile for twelve months to June 30	2,822,000	1,927,000	2,140,000	—
Visible supply for Europe and Egypt at December 31..	1,098,000	430,000	782,000	896,500
Visible supply for U.S.A. at December 31.....	71,000	95,000	132,000	260,000
Visible supply for other countries at December 31	18,000	33,000	17,000	18,000
Stocks in Chile at December 31	498,000	1,576,000	1,304,000	1,441,000
Total supply in sight at December 31 ..	1,685,000	2,235,000	2,134,000	2,615,500

Reduction of Costs

Special interest attaches to the following remarks concerning costs of production and new processes in view of Mr. Aikman's recent return from a visit of investigation to Chile: The crisis in the industry has reduced the production to about 30 per cent. of its normal, and only thirty-four oficinas are to-day in operation, mostly at less than half their capacity. This has brought about a very serious labour situation in Chile, where some 40,000 nitrate workers are being provided for in the south at Government expense. Their capacity is in consequence likely to depreciate, and labour troubles are bound to develop should oficinas reopen in a body. For the future of the trade it is, therefore, important that those companies who have the necessary capital should reopen their oficinas in the near future, as it would appear improbable that so far as extraction in the Pampa is concerned a cheaper cost will ever be attained than to-day, when Chilean exchange is so low. The stocks in Chile in the hands of producers, representing about 1,290,000 tons, are estimated to have cost in the majority of cases the equivalent of about 8s. to 9s. 6d. per qtl. f.o.b., and prices are therefore unlikely to be fixed at a low figure until these are exhausted. Costs are, however, now greatly reduced, and new nitrate could to-day be produced in most cases at 6s. to 7s. 6d. per quintal. New methods are also being actively exploited by which a greater extraction of nitrate from the raw material may eventually further reduce costs by about 6d. to 1s. per qtl.

Synthetic Nitrogen Products

Regarding synthetic nitrogen products, Messrs. Aikman state that the production in Germany was materially reduced by the destruction of the Oppau factory in September. The productive capacity of this factory amounted to 40,000 tons of sulphate of ammonia monthly, and although the Leuna factory is reported to have further increased its production in consequence, it is improbable that the total German production for the current year July, 1921 to June, 1922, which was estimated at 1,800,000 tons of nitrogen products, will much exceed last year's figure of about 1,200,000 tons, which should barely prove sufficient to supply the home demand, and the possibility of export next season is precluded. Latest reports from Germany announce that the Oppau factory has started producing again.

It is reported that the actual stocks to-day are about 200,000 tons of various forms of nitrogenous manure in store in the factories, ready for immediate dispatch, while a further 600,000 tons will be ready between now and the end of April. The real difficulty, however, lies in the fact that owing to the shortage of railway trucks there appears to be great difficulty in distributing this quantity of fertiliser to the consumer. Efforts have been made to right this position for the early months by an exchange of prompt delivery of Chilean nitrate of soda for spring delivery of sulphate of ammonia. It was thought that it would be possible to import and distribute the Chilean nitrate of soda by river transport by way of the Elbe, Oder and Rhine, thus avoiding the difficulties of railway transport, and negotiations are still continuing with this end in view. In America the lease granted by the Government to a large engineering concern of important water-power was reported to be for the purpose of completing synthetic nitrogen works started during the war, which would at once become large producers, but the latest information points to this being utilised chiefly for engineering purposes, and to a maximum production of synthetic sulphate of ammonia in two years' time of about 100,000 tons. In Norway the total production is estimated at about 150,000 tons per annum, of which 70 per cent. is consumed in Scandinavia.

Desk and Pocket Requisites

THE Millwall Engineering Co., Ltd., 21, Panton Street, London, S.W. 1, send a useful wooden desk blotter, on which is a neat and effective reminder that the firm specialise in coils, welded steel fittings, pipe lines, flanges, &c.

"The Scientists' Reference Book and Diary" for 1922, published by James Woolley, Sons & Co., Ltd., Manchester (3s. 6d.), is in itself a miniature library of chemical and pharmaceutical information, in addition to containing the customary features of a pocket diary, pages for monthly cash accounts, and a section for memoranda. This is the twenty-fourth year of issue, a fact which sufficiently indicates its success.

Low Temperature Carbonisation

Recent Progress at Barnsley

IN his speech at a meeting of shareholders of Low Temperature Carbonisation, Ltd., held at the Hotel Victoria, Northumberland Avenue, London, on December 29, Sir Henry Gould Adams announced that the plant at Barnsley was started up at the end of August and had been running continuously to the present time without any mishap, and was still so running; that about 2,000 tons of coal slack had been converted into smokeless fuel; that more than 30,000 gallons of tar oil had been produced, and that the great bulk of it was sold at remunerative prices. He further informed the shareholders of the negotiations for the erection of plants which had resulted from the prolonged test at Barnsley, and mentioned especially two negotiations which were well forward for the sale of foreign rights. He commented on the fact that while it might be strictly true to say that the plant at Barnsley was experimental, many eminent engineers were satisfied as to the commercial success of the same, and that what the company claimed was that what twenty retorts would do, and had done, any number of retorts would accomplish, and show substantial profits.

Mr. Hans Hamilton, of Close Brothers and Co., said it could not be expected, in view of the lack of success attending the company and its predecessors in the past, that business men would come forward until a prolonged trial of the retorts at Barnsley had taken place. He stated that the continuous and satisfactory working of the retorts to date was bearing fruit, and that inquiries were now coming to the company from responsible parties desirous of putting up plants. He then went into some detail as to the distillation of low-temperature tar, a product very little known in this country, and he informed the shareholders that his firm had insisted on the product being analysed by the very best chemists and under the latest methods that were available. It had been analysed in Germany with most satisfactory results. It was being analysed in Manchester by two well-known experts, one of whom had been to Barnsley and reported most favourably upon the operations being carried out there.

Distillation of Tar

Mr. Hamilton further stated that the first results of the distillation of the tar by an English chemist, who for fourteen years had been studying the distillation of certain coals and their by-products, were just to hand. They showed a very much higher yield of good-quality motor spirit than it had been believed possible to obtain.

As far as it had gone, the investigation had convinced the directors that they had an enterprise which was second to none in its possibilities and was of the greatest importance to this country. Germany had established the value of this tar oil, and it would not be long before they would establish in this country for themselves and by themselves the value for it, which one really hesitated to mention at the present time. With regard to the use of "Coalite" in different forms for industrial purposes, he was able to announce that the experiments to date were satisfactory and the full tests and results would be published shortly.

Uroz Oilfields Ltd.

Experimental Tests with Lignite Briquettes

AT the annual meeting in London on Friday, December 30, Capt. A. H. Farley, in moving the adoption of the report, referred to the steady development of the company's properties with regard to their anthracite concessions in France (Vaux and Frejus-Nord). The proving operations which had continued during the year confirmed the high opinion entertained as to the value of these properties, and to-day it was estimated that at least 1,000,000 tons of anthracite were available for immediate exploitation. No commercial output had been aimed at thus far, though everything was in readiness for the commercial exploitation of the anthracite reserves.

Reviewing the progress achieved in the mines at Chateau-double, the lignite field, he observed that during the year development work had been very energetically carried on there, and the results had been very gratifying, proving that the seam existed for a distance of at least 2½ miles. The general mining manager estimated that this area of the properties contained some 3,000,000 tons of lignite, 1,000,000 tons of which Mr. Cowan stated were available for immediate

extraction. The first unit of the briquetting plant commenced operations in August last, and the guarantee that the plant would produce 200 tons of briquettes per day had been clearly demonstrated. The briquettes were spoken of by customers as being of excellent quality. Even with a continuance of the present reduced prices for briquettes in the consuming centres near the Mediterranean—though the directors understood those prices were but temporary—the general manager assured them that substantial profits would be earned as a result of the company's activities in this direction. It would be easily possible to increase their briquetting production as circumstances warranted.

Lignite Experiments

During the past few weeks quantities of their lignite had been received in England for the purpose of experimental tests as to by-products. The important work was entrusted to highly competent people, under the direction of the well-known firm of Close Brothers & Co., Ltd., and the directors had received notification from that firm that the tests carried out had proved that the lignite contained over fifty gallons per ton of light oils. Those light oils were of such a character that over 25 per cent. of them were in the form of motor spirit. They were assured that the figures given as to the oil content of the lignite would be considerably increased. This discovery should have an important bearing upon the ultimate results achieved, especially as very high protective duties were placed upon the importation of motor spirit into France.

Ship Canal Cement Manufacturers

Fertilising Properties of Carbo Limo

SPEAKING at the tenth annual general meeting of the Ship Canal Portland Cement Manufacturers, Ltd., held on December 30 last, at Ellesmere Port, Mr. G. A. Watson, who presided, referred to the completion of a new plant which was now coming into commission. Regarding the demand for cement, he said the large capacity of the works could not yet fully be taken advantage of owing to current trade conditions. Referring to the product, carbo limo, Mr. Watson described carbo limo as the highest grade carbonate of lime from their own quarries and pulverised by special machinery in their own works. They could produce 2,000 tons of carbo limo per week, in addition to a full cement production and, furthermore, owing to the interchangeability of the operating arrangements, 6,000 tons of carbo limo could, if necessary, be produced along with 3,000 to 4,000 tons and upwards of cement per week. The potential demand for carbo limo for agricultural purposes alone was prodigious, and the directors believed that a fair demand would quickly eventuate, particularly at the low price at which they were now able to sell, coupled with their propaganda and the propaganda of the Ministry of Agriculture to impress on the country the necessity of making up the deplorable deficiency now existing in the liming of the lands of the country.

Continuing, Mr. Watson said he hoped to induce other manufacturers to work in conjunction with the company, so that the production of carbo limo could be zoned in different parts of the country, so reducing the cost of transit to the minimum. Carbo limo had many other uses, such as a filler for asphalt, a component part of fertilisers, &c., and these sources of demand the company was now in the position to develop. The Board of Trade made an order under the Coal Mines Act in 1921 and subsequently regulations making it compulsory to dust all metalliferous mines to obviate explosions. The company had found that carbo limo fully complied with the Board of Trade requirements, and consequently they were supplying this material under the trade name of Davy Dust to colliery proprietors for that purpose.

Chemistry Professorship at Rangoon

APPLICATIONS are invited for the appointments of Professor of Chemistry and Lecturer in Chemistry at the University of Rangoon, Burma. Both appointments are in the Indian Educational Service, with pay on the new time scale, together with various allowances. Full particulars may be obtained from the Secretary, Board of Education, London, S.W. 1, or from the Secretary, Scottish Education Department, London, S.W. 1.

Safeguarding of Industries Act

Three Further Complaints

THE Board of Trade have received formal notices of complaint under Sec. 1, Sub-sec. 5 of the Safeguarding of Industries Act, from the Manufacturing Confectioners' Alliance, Incorporated, 9, Queen Street, Place, London, E.C. 4, and from Messrs. Stephenson, Harwood and Tatham, solicitors, of 16, Old Broad Street, London, E.C. 2 (on behalf of certain importers and users), that cream of tartar, tartaric acid, and citric acid have been improperly included in the list of articles chargeable with duty under Part I. of the Act. The Referee will hear these complaints on Saturday, January 21, and any persons directly interested in the matter should communicate immediately with the above-named Association or solicitors or with the Board as they may desire.

Committees under Part II.

A committee, consisting of Dr. J. H. Clapham (chairman), and Messrs. F. J. Blakemore, J. T. Brownlie, J. W. Murray, and Owen Parker, has been appointed to consider a complaint by the British Master Gold and Silver Beaters' Federation and the Gold Beaters' Trade Society that gold leaf manufactured in Germany is being sold, or offered for sale, in the United Kingdom at prices which by reason of depreciation in the value in relation to sterling of the German currency are below the prices at which similar goods can profitably be manufactured in the United Kingdom. The committee propose to hold their first sitting for the taking of evidence at 2.30 p.m. on Monday, January 9, at 5, Old Palace Yard, Westminster, London, S.W. 1. The Secretary of the Committee is Mr. D. Haigh, Board of Trade, Great George Street, London, S.W. 1, to whom all communications should be addressed.

The Board of Trade also announce that they have referred to a committee, consisting of Sir W. M. Acworth (chairman), Messrs. F. P. Dorizzi, Stanley Machim, R. G. Perry, and Arthur Shaw, complaints by the British Aluminium Hollow-ware Manufacturers' Association, the Wrought Hollow-ware Trade Employers' Association, and the National Light Castings Association, that aluminium hollow-ware, wrought enamelled hollow-ware, and plain and enamelled baths manufactured in Germany are being sold, or offered for sale, in the United Kingdom at prices which by reason of depreciation in the value in relation to sterling of the German currency are below the prices at which similar goods can be profitably manufactured in the United Kingdom, and that by reason thereof employment in those industries in the United Kingdom is being, or is likely to be, seriously affected. The committee propose to hold their first sitting for the taking of evidence at 2.30 p.m. on Monday, January 9, at 5, Old Palace Yard, Westminster, London, S.W. 1. The Secretary to the Committee is Mr. H. F. Hill, Board of Trade, Great George Street, London, S.W. 1, to whom all communications should be addressed.

Boiler House Management

A PAPER ON "Boiler House Management," read by Mr. D. Brownlie before the South Wales Institute of Engineers at Cardiff recently, has stimulated considerable interest in South Wales, writes a correspondent of THE CHEMICAL AGE. In this connexion Mr. J. W. Burr, of Swansea, points out that in order to effect the saving of coal referred to in the interim report of the Coal Conservation Sub-committee, published in 1918, it would be necessary to erect super plants on suitable sites and feed into a main trunk distribution system, and he is of the opinion that it will be some years before these conditions obtain. While he does not think it possible to effect the saving by any other means than those suggested by the Sub-committee, he believes that much can be done in this direction by modernising and carefully supervising the existing plant. The present consumption for the country as a whole is taken as 5 lb. of coal per h.p. hour. He claims it should not be difficult to reduce this figure to half, provided that we have better coal selection, complete equipment with all instruments and apparatus for controlling combustion, and perfect supervision of the engine-room and boiler house.

Safeguarding British Glassware

Inquiry Adjourned until January 10

THE committee appointed under Part II. of the Safeguarding of Industries Act, which is dealing with the complaint regarding the imposition of a tax on domestic, illuminating and mounting glassware, resumed its sittings on Tuesday.

SIR ARTHUR COLEFAX, K.C., who, with Capt. Ernest Evans, M.P., appeared for the China and Glassware Section of the London Chamber of Commerce, said he was sure the committee would not be a party to penalising imports from one country in order to help importation from another country, which would be the effect of a tax on goods imported from Germany and Czecho-Slovakia. The primary object in view was to help British industry, and the committee had to find an established manufacture in this country capable of substantially supplying the demand.

MR. C. G. BROOKS briefly touched on domestic glassware, and mentioned jugs and water-bottles. The majority of those used in this country were of Belgian and Dutch manufacture, owing to their low price. Very little pressed glass was imported into this country from Bohemia. The effect of the imposition of a tax on goods imported from Germany and Bohemia, he said, would not be to help the unemployment position on the manufacturing side here.

MR. F. R. LANG disagreed with previous evidence which had been given with regard to the prices of German glassware. His experience was that prices were at least double what they were before the war, and as English prices had been said to have risen to double the pre-war figure, the proportions were about equal. German prices were now rising, so much so that it was almost impossible for British importers to do business with German firms.

MR. B. L. COHEN said that the one particular tumbler which English manufacturers were able to produce and sell at less than Continental prices was the thick moulded tumbler used by licensed victuallers, and it was well known that English manufacturers were able to sell considerably below prices quoted by Belgian and Dutch makers. English pressed glass manufacturers were always able to meet foreign competition as regards prices.

At the resumption of the hearing on Wednesday, MR. SIMON MARKS said there was a great demand in this country for cheap plain tumblers, but he was not aware that they had ever been made here.

MR. JAMES BATEMAN said that before the war there were three well known lines of heat-resisting glass known as Jena, Resisto and Monopel. Since the war, however, Monopel and Resisto glass had not been manufactured at all, and very little Jena. Messrs. Chance Brothers appeared to have secured practically all the trade that was available in this line. Messrs. Chance Brothers had suggested that heat-resisting glass came here from Japan, France and Sweden, but Japan and Sweden did not manufacture heat-resisting glass, and France only sent in a very small proportion, and that not of the highest quality. The position complained of to-day was due to the general slackness in trade and not to imports.

COL. S. OGILVIE, joint general manager of the National Gas Council, said that in January, 1921, the council had passed a resolution to the effect that the free import of mantles and heat-resisting glass was essential to the gas industry. If a higher price was charged for illuminating glassware, which was already too high, there was no doubt that fewer burners would be used and less gas consumed, with consequent unemployment in the gas industry.

MR. BASSETT, of Messrs. Chance Brothers, said it had been stated that his firm was getting 90 per cent. of the large-size work. They were getting no business in the small trade at all, owing to foreign competition.

After hearing further evidence, the committee adjourned until Tuesday, January 10.

Industrial Welfare

WITH the abbreviated title *Industrial Welfare* the first number of Vol. IV. of the *Journal of Industrial Welfare*, the monthly publication of the Industrial Welfare Society, states that it is entering upon a campaign with a view to making the practical developments of the welfare movement more widely known. The aim of the Society may briefly be summarised as an endeavour to secure the greatest possible measure of confidence and co-operation between employers and employed.

From Week to Week

The Consett Iron Co., Ltd., require the services of a YOUNG CHEMICAL ENGINEER as manager at one of their coke and by-product works.

It was reported on Wednesday that the WAGES OF GLASS-WORKERS in the West Midlands are to be reduced by 7s. per week of 48 hours.

A Board of Trade order for the taking, in 1923, of a CENSUS in respect of the production of the year 1922, was published in the *London Gazette* on Tuesday.

The coasting steamer, *Lady Anstruther*, of 650 tons dead-weight capacity, has been launched for NOBEL'S EXPLOSIVES Co., LTD., West George Street, Glasgow.

As from January 1 the title of the Texaco Petroleum Product Co., Ltd., Imperial House, Kingsway, London, W.C. 2, was changed to the TEXAS OIL Co., LTD. The change is in name only.

JOHN MACKAY & Co., LTD., manufacturing chemists, of Canning Street, Edinburgh, have purchased the old flour mills at Blalowan, Cupar. The mills are in the neighbourhood of the company's Kolacafe Works.

With reference to their recent circular advocating a continuance of their scheme of voluntary restriction of output, the Council of the Rubber Growers' Association report that the required minimum of assents had not been received.

Principal J. C. Irvine has been appointed President, and Professor C. H. Desch, Recorder, of the Chemistry Section of the BRITISH ASSOCIATION for the meeting to be held at Hull on September 6-13 next under the presidency of Professor C. S. Sherington.

A JOINT MEETING of the Society of Chemical Industry with the Institution of Mechanical Engineers was held at Storey's Gate, London, on Friday, when Mr. G. M. Gill read a paper on "The Co-operation of the Engineer and Chemist in the Control of Plants and Processes."

LEVER BROTHERS, LTD., announce a prize competition in connexion with a fancy dress skating carnival to be held at Cricklewood Skating Rink, London, on January 12. The firm offer a number of prizes for the best fancy dress costumes dyed exclusively with their "Twink" dyes.

BRUNNER, MOND, & Co., LTD., state that a report to the effect that they have stopped selling in Japan is quite untrue, and that there is no foundation for the suggestion that there is an understanding between the firm and the Magadi Soda Co. This account did not appear in THE CHEMICAL AGE.

The Milan correspondent of the *Daily Telegraph* reports the death of SENATOR CIAMICIAN, professor of chemistry at Bologna University. He was well known for his studies on the constituents of complex organic matters, and especially on the chemical action of light on such substances.

Indiarubber expanded by gas into a highly cellular form has been found by investigators at the National Physical Laboratory to be a GOOD INSULATING MEDIUM for cold storage purposes. It is also rumoured that the production of newsprint from rubber is a possible development of importance to the rubber industry.

The Finsbury Technical College Old Students' Association will hold a SMOKING CONCERT at the Engineers' Club, Coventry Street, London, on Friday, January 27, at 8 p.m. The concert will be preceded by an informal dinner. Names of members wishing to attend the dinner should be handed to the hon. secretary before January 20.

SIR GERMAN SIMS WOODHEAD, Professor of Pathology at Cambridge University since 1899, died at Scampton, near Lincoln, on December 29, aged 66. He was Inspector of Laboratories in military hospitals in the United Kingdom, and was responsible for the introduction of the chlorination of water supplied to the troops during the war.

A meeting of the OIL AND COLOUR CHEMISTS' ASSOCIATION will be held on January 12 at the Food Reform Club, 2, Fumival Street, London, at 7.30 p.m., when a paper entitled "Super Centrifugal Force and its Application to the Clarification of Varnish and Dehydration of Oil" will be read by Mr. A. H. Keable. The lecture will be illustrated by demonstrations.

Speaking on Monday at the Educational Association's Conference at the University College, Gower Street, London Sir Charles Stewart said research work had never been very popular in this country. In Germany, however, no firm con-

sidered itself properly equipped without SEVEN OR EIGHT CHEMISTS, and the result was that in certain directions they had reaped the reward of that research.

THE CHINA CLAY trade of Cornwall, which provides raw material for a remarkably large number of manufacturing industries, including paper, pottery, cotton goods, chemicals, and latterly soap and road surface materials, is reported to be recovering from a period of abnormal depression. The revival is due largely to the receipt of substantial orders from the paper industry of the United States and at home.

There was a large gathering at the Treorchy Cemetery on December 30, on the occasion of the funeral of Mr. Henry John Abraham, the youngest son of the Right Hon. William Abraham (Mabon), the veteran miners' leader. Mr. H. J. Abraham was until recently manager of a bye-product works at Maesteg. He had been in failing health for twelve months, and on medical advice had removed to Porthcawl, where he died. He leaves a widow.

We understand that Ransomes, Sims & Jefferies, Ltd. of the Orwell Works, Ipswich, have just been appointed sole manufacturers and licensees in the United Kingdom, the Colonies and Dependencies, South America, Dutch Indies and China, for the patent Kestner Water Tube Boiler. This boiler has been a great success in France, where the highest economy is essential in steam generation. It is manufactured in that country by the well-known firm of Schneider & Co., of Le Creusot, and is in use at many of the large power stations.

SIR WILLIAM HENRY TATE, formerly chairman of Henry Tate & Sons, Ltd., sugar refiners, of Liverpool and London, died on December 31 at his Welsh residence, Bodhyddan, Rhuddlan. The eldest son of Sir Henry Tate, he was born in January, 1842, entering his father's business at an early age. Succeeding to the chairmanship of the company on his father's death in 1899, he retained this position until March last, when he was obliged to resign owing to ill-health. He is survived by his widow, two sons, and seven daughters.

The Treasury has authorised the Commissioners of Customs and Excise to waive the payment of duty under Part I of the Safeguarding of Industries Act in the case of toys and fancy goods which are dutiable under Part I of the Safeguarding of Industries Act only as CONTAINING DUTIABLE ARTICLES AS PARTS OR INGREDIENTS, and for which Customs entries have not been passed before January 1, 1922, provided that the value of such dutiable parts or ingredients is shown to represent not more than 10 per cent. of the total value of the whole article in each case.

We regret to record the death, on December 23, at Blackwell, near Bromsgrove, of SIR THOMAS BARCLAY, chairman and managing director of Southall Brothers & Barclay, Ltd., manufacturing chemists, of Birmingham. Born at Sunderland in 1839, Sir Thomas entered the employ of Southall Brothers, of Birmingham, in 1861, of which firm he was made a partner in 1886. On the formation of the present company he became chairman and managing director, a position which he retained until his death. He is survived by his widow, two sons, and five daughters.

MR. WILLIAM SIMONS, managing director of the Shelton Iron, Steel, and Coal Co., Ltd., Stoke-on-Trent, has been appointed general manager of the Cardiff-Dowlais Steelworks, of Guest, Keen, & Nettlefolds, Ltd., in succession to Mr. A. K. Reese. During the war Mr. Simons acted on the Steel Consultative Committee of the Ministry of Munitions. He is on the board of the Earls Barton Iron Ore Co., Ltd., the New Acid Co., Ltd., the New British Basic Slag (Alberts Successors), Ltd., the Staffordshire Chemical Co. (1917), Ltd., and the Steepby Lime Co., Ltd. It is understood that Mr. Simons will not take up his new appointment for some months.

Under the auspices of the British Engineering Standards Association, experiments are being made with a view to discovering some means of increasing and cheapening the supply of PORTLAND CEMENT. The object of the research is to ascertain whether cement made from blast-furnace slag cannot be made according to a recognised specification which would enable it to be used for work in which Portland cement, manufactured according to the British standard specification, has hitherto been employed. It is thought that if a new standard specification can be agreed upon for iron Portland cement, the output of this material will greatly be encouraged, and this production will exert a great influence on prices.

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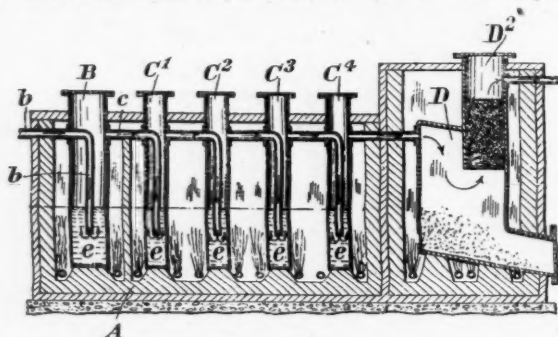
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Abstracts of Complete Specifications

172,035. CARBON FOR PIGMENTAL AND OTHER PURPOSES, MANUFACTURE OF. J. Nelson, 86, St. Vincent Street, Glasgow. Application date, May 21, 1920.

The object is to obtain carbon in a soft, amorphous, very voluminous form, and free from oily or tarry matter, so as to be suitable as a pigment. The carbon is obtained by heating hydrocarbon oils or gases to 500°-700°C. in the absence of air, and passing the gaseous products into a collecting chamber in which the finely-divided carbon is deposited, the temperature of the chamber being maintained sufficiently high to prevent condensation of the oily or tarry matter on the carbon. Oil is passed through a pipe *b* into a retort B containing a fusible contact material *e*, such as lead, which is maintained by the furnace A at a temperature sufficient to effect continuous vaporisation of the oil. The vapour



172,035

passes by a pipe *c* into a cracking vessel C¹, which also contains molten lead *e*. The vapour then passes in succession through three additional cracking vessels C², C³, C⁴, each containing molten lead *e*. The temperature of the lead in all these vessels is maintained sufficiently high to prevent any condensation in them or in the communicating conduits. The vapour then passes into a chamber D, which is heated to about 400°C., in which the carbon settles, and then through filter D², which retains any carbon not deposited in the chamber D. The carbon in the chamber D must be cooled to a temperature below the ignition point before exposure to the atmosphere, and this may be effected by passing a current of gas through it, such as the non-condensable oil-gas produced in this process. In an example a crude hydrocarbon oil of specific gravity 0.975 was cracked at an average temperature of 613°C., while the temperature of the chamber D was maintained at 410°C. The carbon obtained had an apparent specific gravity of about 0.10 to 0.16, while the yield amounted to about 6.8 per cent. of the weight of the oil cracked.

172,046. DE-TINNING IRON, PROCESS FOR. Thermal Industrial and Chemical (T.I.C.) Research Co., Ltd., and J. S. Morgan, 52, Grosvenor Gardens, London, S.W. 1. Application date, June 8, 1920.

When sheet iron is tinned it is previously treated with a flux which affects the surface tension of the tin in such a way as to cause it to adhere to the iron. It has now been found that some substances have a reverse effect, i.e., the tin is prevented from wetting the iron and adhering to it. Caustic soda and other hydroxides which are liquid at the melting point of tin have this property, but any substance may be tested by immersing the tinned iron in it. If the tin collects in small globules on the surface of the iron, the substance has the required "anti-flux" properties. In de-tinning iron by this process, the iron is first treated with the "anti-flux," and then passed into a bath of molten tin, lead, or lead alloy, when the tin is detached from the iron and enters the metal of the bath. Alternatively, the iron may be passed through a bath of molten lead covered with the "anti-flux." The bath of molten lead may be divided by vertical partitions into three compartments, the central compartment containing molten caustic soda on the surface of the lead. The tinned iron is submerged in one end compartment, passed under the partition into the central compartment, where it is raised into the caustic soda, and then submerged again and passed into

the third compartment, from which it is withdrawn in a de-tinned condition.

172,048. TANNING AGENTS, MANUFACTURE OF. A. G. Bloxam, London. (From Gerb-und Farbstoffwerke H. Renner & Co., Akt.-Ges. Billhorner-Canalstrasse 20, Hamburg 27, Germany.) Application date, June 25, 1920.

When certain coal tar fractions such as solvent naphtha and heavy benzole are purified by treating with concentrated sulphuric acid, acid resins and coumarone resins are produced as by-products, the acid resin being already known as a tanning agent. The coumarone resins are now separated and again treated with concentrated sulphuric acid, when they are converted into products resembling the acid resins and possess tanning properties. If the coal tar oils are treated initially with a large excess of concentrated sulphuric acid, the coumarone resin is completely converted into acid resin without separation. Fuming sulphuric acid may be used instead of concentrated sulphuric acid, when the conversion of the resins into tanning agents is facilitated and the yield is increased. Several detailed examples of the process are given.

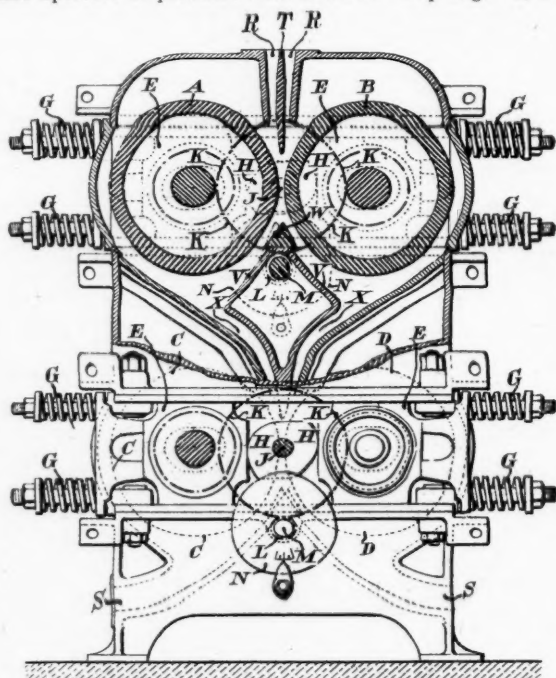
172,056-7. DIAZOTISABLE AZO-DYESTUFFS. O. Y. Imray, London. (From Society of Chemical Industry in Basle, Switzerland.) Application date, July 23, 1920.

172,056. The process is for producing easily soluble diazotisable azo-dyestuffs. The starting material is a diazotisable azo-dyestuff which is produced by combining diazotisable components with coupling components of the naphthalene series which contain external amino groups, such as the sodium salt of the azo-dyestuff from diazotised β -naphthylamine and 2-(3-amidobenzoyl)-amino-5-oxynaphthalene-7-sulphonic acid. This material is treated with formaldehyde bisulphite or a mixture of formaldehyde and bisulphite. The product is salted out, filtered and dried. Several examples are given in detail.

172,057. The same dyestuffs as in 172,056 are obtained by coupling a diazo compound with a coupling component of the naphthalene series having an external N-methyl- ω -sulphonic acid residue.

172,067. PULVERISING ORE AND THE LIKE, APPARATUS FOR. G. Johnston, Gala Bank, Ulverston, Manchester. Application date, July 30, 1920.

The material to be ground is drawn by suction through an inlet aperture R provided with a central diaphragm T, and



172,067

is directed on the periphery of the rolls A, B, the peripheral speed of which is approximately equal to that of the air stream. These rolls are carried in bearing blocks E, which are pressed together by springs G, and are set at the necessary distance apart by cams H between the blocks E on each side of the casing. The adjustment of the cams is effected by means of a shaft M carrying pinions L, which gear with toothed wheels K on the cam shaft J. The shaft M carries discs N, which are graduated to show the adjustment of the cams. The material after passing the rolls A, B, is divided by means of a device V having teeth W, which are alternately inclined in opposite directions. The material passes through ducts X to a second pair of rolls C, D, which are set closer together and driven at a higher peripheral speed. The ground material is finally delivered through passages S.

172,074. RECOVERY OF SULPHUR FROM SULPHURETTED HYDROGEN AND AMMONIUM SULPHIDE AND GASES CONTAINING SUCH. E. E. Naef, 16, Loughborough Road, West Bridgford, Nottingham. Application date, August 23, 1920.

Sulphuretted hydrogen mixed with air or oxygen is passed at ordinary temperature over active finely-divided charcoal, such as that known as "eponite" and "norite." The sulphuretted hydrogen is completely decomposed with formation of water and liberation of sulphur. The charcoals are capable of absorbing a large amount of oxygen, so that sulphuretted hydrogen without admixture of air or oxygen may be treated for the recovery of sulphur until the oxygen in the charcoal is exhausted. It is then necessary to add sufficient oxygen to oxidise the hydrogen but not the sulphur. If a gaseous mixture containing sulphuretted hydrogen such as illuminating gas, coke-oven gas, producer gas, or water gas is treated, the sulphur is recovered without affecting the ammonia in the mixture. An aqueous solution of ammonium sulphide or hydro-sulphide may be treated with active charcoal in a similar manner, in which case sulphur is deposited and ammonia is liberated. Reference is directed in pursuance of Sec. 7, Sub-sec. 4, of the Patents and Designs Acts, 1907 and 1919, to Specifications Nos. 1410/1879, 5070/1883, 146,141 and 146,145.

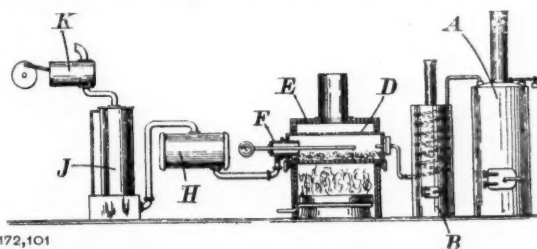
172,087. ALUMINA, EXTRACTION OF. D. Tyrer, Stockton-on-Tees Chemical Works, Ltd., Stockton-on-Tees. Application date, August 24, 1920.

The object is to obtain pure alumina from materials such as bauxite, clays, blast furnace slag, coal or coke ashes, &c. The material is very finely ground and then intimately mixed with finely-ground lime or limestone in such proportions that not less than two molecules of lime are provided for each molecule of silica and not less than one molecule of lime for each molecule of alumina. The best results are obtained by using 2.3 molecules of lime to each molecule of silica. Any iron oxide present is calculated as lime, and allowance is made for lime, magnesia or alkali already present in the material. The excess of lime decreases the temperature necessary in the subsequent calcination. A small quantity of a flux such as fluorspar may also be added to assist the reaction. This mixture is calcined at about 1,200°C. for four hours, and then cooled and digested with sodium carbonate solution of 10-15 per cent. strength. The amount of sodium carbonate should be sufficient to convert the alumina into sodium aluminate. The insoluble residue is then filtered off and the solution treated for the recovery of alumina, *e.g.*, by the Bayer process, the soda produced being recovered in any suitable manner. Alternatively, the solution may be treated with lime-kiln gas to precipitate the alumina and produce a solution of sodium carbonate, which may be filtered off and used again in the digestion process. The insoluble residue from the digestion process, consisting of calcium silicate and carbonate, is free from alkali, and is particularly suitable as a raw material for the manufacture of cement. Any potash contained in the raw material is recovered from the sodium carbonate solution.

172,101. COMPLEX SULPHIDE ORES, TREATMENT OF. W. G. Perkins, 1, London Wall Buildings, London, E.C. 2. Application date, August 28, 1920.

The process is for eliminating iron from complex sulphide ores and concentrates. Ores containing zinc and iron sulphides and other metallic sulphides, such as galena, chalcopryrite, stibnite, &c., may be treated by flotation processes for the separation of the galena, copper sulphides, &c., from the zinc and iron sulphides, but difficulties are usually experienced in separating zinc sulphide from iron sulphides such as

marcasite and pyrites. In this process the mixture of zinc and iron sulphides is subjected to heat treatment in the presence of superheated steam to render the iron sulphide paramagnetic, and therefore capable of separation by a magnetic separator. The chemical reaction involved is endothermic, and as sufficient heat is not obtained from the steam, external heating is also required. In this process the amount of external heating is reduced by allowing the steam to affect the pyrites particles only superficially, but sufficiently to render them magnetic. The powdered ore is subjected to



agitation during treatment with the steam. A steam generator A is heated by waste heat from the furnace, and the steam is passed through a superheater B, where it is heated approximately to the temperature of the ore. The steam then passes into a closed rotating steel cylinder D mounted in a furnace E. The powdered ore is thus subjected to the action of the steam, and is partly oxidised and the sulphur converted into sulphuretted hydrogen and sulphur dioxide. The gases pass through the axial outlet F to condenser H, where the sulphuretted hydrogen and sulphur dioxide react to produce sulphur, which is condensed. Any particles of ore carried over by the gas are also collected. Any permanent gas remaining is of small volume, and may be treated in a scrubber J for the removal of sulphur compounds. The gases then pass through a vacuum pump K. It is found that a temperature of 425°C. in the chamber D is satisfactory for this process, but the temperature may vary between 300°C. and 500°C. The ore may be supplied to and withdrawn from the chamber D by gas-tight supply devices, and may pass through the chamber in counter-current to the steam. Air may be introduced if necessary to oxidise the sulphuretted hydrogen completely.

172,177. DYESTUFFS, MANUFACTURE OF. O. Imray, London: (From Society of Chemical Industry in Basle, Switzerland.) Application date, October 2, 1920.

Tetrachloro-methane is treated with α -naphthol or a substitution product in which the 4-position is free, together with an acid neutralising agent such as an alkali or alkaline earth, hydroxide or carbonate, or the corresponding magnesium compounds. A small quantity of a catalyst such as copper powder is also added. Examples are given of the treatment of α -naphthol, 1-naphthol-2-carboxylic acid, and 1-oxy-2-naphthoic acid in this manner. These products are themselves dyestuffs, or may be used as intermediates in the production of other dyestuffs. The product obtained from 1-naphthol-2-carboxylic acid is considered to be of particular value.

172,205. BICHLORIDE OF MERCURY, MANUFACTURE OF. K. Schantz, Reischstrasse 8, Freiburg im Breisgau, Germany. Application date, November 5, 1920.

In the manufacture of bichloride of mercury, the mercury is passed through an atmosphere of chlorine under slight pressure into a liquid which is not an absorbent of chlorine. Suitable liquids are solutions of chlorides, including mercury bichloride, and hot water. The liquid is placed in a rotating drum provided with internally projecting blades which lift the mercury out of the liquid and drop it back through the atmosphere of chlorine. If hot water is used, it is gradually converted into a solution of mercury bichloride, from which the salt may be crystallised out on cooling. The temperature of the liquid is kept below boiling-point by the admission of fresh cold solution. The liquor remaining after crystallisation may be used again.

172,250. LIQUID SOAPS CONTAINING WATER OR THEIR FATTY ACIDS, TREATMENT OF. Henkel & Cie., Dusseldorf-Holthausen, Heyester 67, Germany. International Convention date, December 16, 1920.

Liquid soaps containing water or their fatty acids are heated under pressure to convert the fatty acids into acids

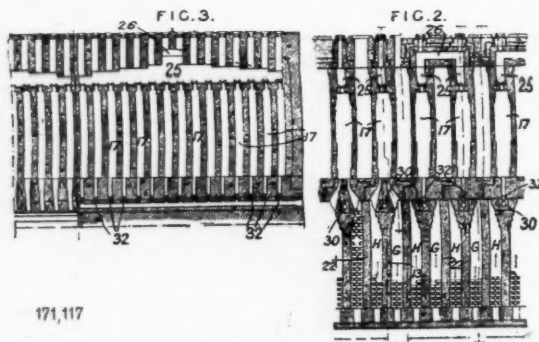
resembling oleic acid, or their soaps. This operation has been effected at a temperature of 200°-250°C. in an autoclave at a pressure of about 40 atmospheres, but difficulties are experienced in obtaining a uniform temperature throughout the mass, and consequently a uniform product. In this invention the soap is forced through a pipe, where it is first subjected to a temperature of about 200°C., and then at another portion of the pipe to 250°C. Additional alkali may be added in the second stage of the process. In an example, a soap containing about 60 per cent. of a fatty acid and having an iodine number of 130 is heated in a 1½ inch pipe to 230°C., which reduces the iodine number to 110-115. The soap then passes through a pipe heated to 300°C., which reduces the iodine number to 90. If during this stage about 5 per cent. of soda lye of 40°Bé. is added, the iodine number is reduced to 80. This process deodorises the soap and removes its dark colour.

NOTE.—Abstracts of the following specifications which are now accepted appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention: 155,572 (R. Seifert) relating to production of zinc dust, see Vol. IV., p. 258; 165,771 (A. Zinke) relating to manufacture of dioxyperylene, see Vol. V., p. 287.

International Specifications not yet Accepted

171,117. COKE OVENS. J. Becker, 800, Union Arcade Building, Pittsburg, U.S.A. International Convention date, November 8, 1920.

The coking chambers are heated by flues 17 on either side, which are supplied with coke-oven gas or regeneratively heated producer gas, which is injected through conduits 30 and nozzles 32 at the base of the flues. The flues in each heating wall are divided into two groups, each occupying one half of the length



of the wall. A collecting flue 25, which tapers towards each end, is provided for each group and, the corresponding groups in two adjacent heating walls are connected together by cross flues 26. The ovens are mounted above regenerators G, H, which are grouped in a similar manner to that of the flues, those regenerators on opposite sides of the walls 13 being in the same phase. Regenerators G, H, are used for air and producer gas preferably, or if coke-oven gas is used, all are employed for heating the air or half may be used for supplying waste gases for dilution.

LATEST NOTIFICATIONS.

- 173,216. Manufacture and production of micanite and apparatus to be employed therein. Hermann, H. December 21, 1920.
- 173,225. Manufacture of resin. Barrett Co. December 22, 1920.
- 173,230. Manufacture of colloidal soluble substances and of suspensions or emulsions. Lilienfeld, Dr. L. December 21, 1920.
- 173,235. Methods of producing gases for heating and other purposes from small-sized fuel rich in ashes. Terres, E. December 21, 1920.
- 173,236-7. Process for the preparation of rare metals and alloys and oxides thereof. Westinghouse Lamp Co. December 21, 1920.

Specifications Accepted, with Date of Application

- 144,663. Modifying the physical characteristics of solid substances produced by chemical reactions, Process for. T. Goldschmidt Akt.-Ges. July 28, 1918.
- 147,051. Coke-oven gases, Treatment of. J. I. Bronn. November 21, 1914. Additional to 146,839.
- 147,470. Volatilisable metal oxides, Processes of and apparatus for obtaining. F. D. S. Robertson. December 16, 1918.

- 147,745. Oil and the like, Process and apparatus for the continuous extraction of. M. Wilbuschewitsch. July 8, 1920.
- 148,139. Formaldehyde and phenols, Process for the production of derivatives of condensation products of. Dr. H. Bucherer. June 10, 1918.
- 148,773. Destructive distillation of mineral and organic substances, Apparatus for. Soc. Anon. Fours Speciaux. June 30, 1919.
- 150,744. Synthesis of ammonia, Processes and apparatus for. L'Air Liquide. Soc. Anon. pour l'Etude et l'Exploitation des Procédés G. Claude. September 8, 1919.
- 151,925. Heavy hydrocarbon oils into lighter oils, process and apparatus for decomposing. R. D. George. September 30, 1919.
- 172,667. Detergents and bleaching compounds or agents. J. F. Moseley and N. Drey. June 8, 1920.
- 172,682. Intermediates and dyestuffs of the anthraquinone series, Manufacture of. F. W. Attack and C. W. Soutar. August 5, 1920.
- 172,685. Calcium carbide, Production of. Alby United Carbide Factories, Ltd., and J. W. Mitchley. August 10, 1920.
- 172,688. Hydrogenation of naphthalene. G. Schroeter and Tetralin Ges. August 11, 1920. Addition to 147,474.
- 172,711. Rubber, Manufacture of. W. Feldenheimer, W. W. Plowman, and P. Schidrowitz. September 7, 1920.
- 172,739. Coke-ovens. B. Zwilling. September 15, 1920.
- 172,754. Vulcanisation of materials related to rubber, Process for. S. J. Peachey and A. Skipsey. September 22, 1920. Addition to 129,826.
- 172,783. Tar and oils, Means for facilitating the separation of liquor from. S. Glover, J. West, and West's Gas Improvement Co., Ltd. October 2, 1920.
- 172,858. Sodium thiosulphate, Manufacture of. L. Hargreaves and A. C. Dunningham. December 1, 1920.
- 172,864. Anthracene and carbazole, Separating and purifying. A. Kagan. December 8, 1920.
- 172,885. Oil-separators. J. Foster. February 10, 1921.

Applications for Patents

- Abbott, R. H. S. and Davidson, T. M. Destructive distillation of coal, &c. 34,941. December 29.
- Burt, Boulton, & Haywood, Ltd., and China, F. J. E. Apparatus for distilling coal tar, petroleum, &c. 34,846. December 28.
- Elektro-Osmose Akt.-Ges. (Graf Schwerin Ges.), and Bloxam, A. G. Colloidal-chemical processes for purifying substances. 35,062. December 30.
- Gerb-und Farbstoffwerke H. Renner & Co. Akt.-Ges. Manufacture of salts of sulphonated coumarone resins. 35,064. December 30. (Germany, January 8.)
- Hendon Paper Works Co., Ltd., and Budde, C. C. L. G. Incorporation of rubber, gutta-percha, and balata with viscose and viscoids. 35,021. December 30.
- Holmes, G. A. Means for regulating supply of hydrocarbon liquid to carburettors. 34,896. December 29.
- Holmes & Co., Ltd., W. C. Apparatus for bringing liquids and gases, vapours, fumes, &c., into intimate contact. 34,804. December 28.
- Lütschen, E., and Metzger, C. Method of separating gaseous or liquid mixtures. 35,082. December 30. (Germany, September 16.)
- Meter, J. W. van. Method of producing poisonous gases. 33,360. December 12.
- Mitchell, J. L. Manufacture of lithopone. 35,150. December 31.
- Nobel's Explosives Co., Ltd., and Joyner, R. A. Manufacture of hydrazine. 34,970. December 29.
- Pole, J. C. Interrupter for metal-vapour apparatus ignited by high-tension impulses. 33,369. December 12. (Austria, December 11, 1920.)
- Soper, E. C. Treatment of phosphates. 34,830, 34,831. December 28.

Catalogues Received

An interesting 36-page booklet describing and illustrating automatic centrifugal clutches has just been issued by Thomas Broadbent & Sons, Ltd., of Huddersfield. Centrifugal clutches were evolved in order to overcome the difficulty experienced in starting and accelerating motors driving loads requiring a large starting torque, without the use of special switchgear and with a minimum starting current. The brochure shows several types of clutches which are adaptable to all types of drives. The makers recommend their use in conjunction with any kind of motive power. Results of tests carried out on a Broadbent centrifugal clutch coupling, together with oscillograph records, are also shown. Pamphlet No. 101, issued by Reavell & Co., Ltd., of Ranelagh Works, Ipswich, deals with their turbo compressors and exhausters. The outstanding feature of these machines is the new design of the diffuser blades fixed in the stator.

Market Report and Current Prices

Our Market Report and Current Prices are exclusive to THE CHEMICAL AGE, and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The weekly report contains only commodities whose values are at the time of particular interest or of a fluctuating nature. A more complete report and list are published once a month. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers; those interested in close variations in prices should study the market report.

LONDON, JANUARY 4, 1922.

THE holiday period has now merged in the stock-taking period, and the demand for most chemicals has fallen flat. It is thought, however, that a substantial improvement will occur during the early part of this month. The export demand is particularly quiet.

General Chemicals

ACETONE remains in good demand, and the price is firmer.
ACID ACETIC.—The demand has slackened off for the moment, but the undertone inclines upward.
ACID CITRIC.—Unchanged.
ACID FORMIC.—The price is firm, but the demand is nominal.
ACID OXALIC is held for higher prices, which would seem likely to be realised shortly.
ACID TARTARIC.—Unchanged.
BLEACHING POWDER.—Unchanged.
COPPER: SULPHATE remains dull and lifeless.
FORMALDEHYDE has been a little easier on realisation of certain stocks, but manufacturers show no inclination to reduce their limits.
IRON SULPHATE.—Unchanged.
LEAD ACETATE is only a nominal market, but the price seems to have found its level.
LEAD NITRATE.—Unchanged.
LITHOPONE is only in slow demand; price unaltered.
POTASSIUM CARBONATE remains a weak market, with little doing.
POTASSIUM CAUSTIC.—There are still large stocks, which are difficult to place.
POTASSIUM CHLORATE.—Unchanged.
POTASSIUM PRUSSIAN.—Stocks are in few hands, and are firmly held.
SODA ACETATE has been a quiet market, but the tendency is firm.
SODA NITRATE is slightly easier, with little business doing.
SODA PRUSSIAN.—Manufacturers are now selling into the second half of next year. The market is particularly strong, and further advances in price are indicated.

Coal Tar Intermediates

Buyers continue to show interest, but little business is actually passing as yet, owing to a large extent to the New Year holiday. Most works, however, should by now have recommenced buying, and inquiries are beginning to come in more freely.
ALPHA NAPHTHYLAMINE continues to pass slowly into consumption at about recent values.
ANILINE OIL and SALT have now been reduced in price, but trade is on the light side.
BENZIDINE BASE has been inquired for.
BETA NAPHTHOL is moderately quiet, but firm in price.
DIMETHYLANILINE is in demand on both home and export account.
DIPHENYLAMINE is very firm, both in the home and foreign markets, the quantity available in this country not being large.
NITROBENZOL is uninteresting.
RESORCIN continues lifeless.

Coal Tar Products

The year opens with a more hopeful tone with regard to business, but it is too early to determine whether there is due ground for the hope of better times.
90's BENZOL is quoted at 2/5d. to 2/6d. on rails with occasional transactions at a shade under the lower price.
PURE BENZOL is quoted 3s. in the North, 3s. 6d. in London, and some transactions have taken place in the North at about the former price.

CREOSOTE OIL.—The supply is not over-abundant, and the decline appears to be arrested. Business has been done at 5-1/4d. to 5 1/2d. in the North and 6 1/2d. in the South.

CRESYLIC ACID is quiet without change in value.

SOLVENT NAPHTHA is still in very poor demand, with sellers at 2/4d. to 2/6d. for 90/160 and 2/3d. to 2/4d. for 90/190.

PITCH.—The market is steady with limited demand for early deliveries, but buyers show little disposition to act at all freely on the present level of prices. To-day's values are 60s. to 62s. 6d. f.o.b. London, 57s. 6d. f.o.b. East Coast, and 55s. f.o.b. West Coast.

NAPHTHALENE.—The market is dull, with no change in values.

Sulphate of Ammonia

There is no change in the quotations, nor any new features to report.

Current Prices

Chemicals

	per	£	s.	d.	to	£	s.	d.
Acetic anhydride.....	lb.	0	1	10	to	0	2	0
Acetone oil	ton	87	10	0	to	90	0	0
Acetone, pure.....	ton	82	10	0	to	85	0	0
Acid, Acetic, glacial, 99-100%.....	ton	52	10	0	to	55	0	0
Acetic, 80% pure	ton	45	0	0	to	48	0	0
Arsenic	ton	95	0	0	to	100	0	0
Boric, cryst.....	ton	65	0	0	to	68	0	0
Carbolic, cryst. 39-40%.....	lb.	0	0	6 1/2	to	0	0	7
Citric	lb.	0	2	2	to	0	2	3
Formic, 80%	ton	65	0	0	to	67	10	0
Gallic, pure.....	lb.	0	3	10	to	0	4	0
Hydrofluoric	lb.	0	0	8 1/2	to	0	0	9
Lactic, 50 vol.....	ton	40	0	0	to	43	0	0
Lactic, 60 vol.....	ton	43	0	0	to	45	0	0
Nitric, 80 Tw.....	ton	38	0	0	to	40	0	0
Oxalic	lb.	0	0	8	to	0	0	8 1/2
Phosphoric, 1.5	ton	45	0	0	to	47	0	0
Pyrogallic, cryst.....	lb.	0	7	0	to	0	7	3
Salicylic, Technical	lb.	0	1	0	to	0	1	1
Salicylic, B.P.....	lb.	0	1	4	to	0	1	5
Sulphuric, 92-93%.....	ton	8	0	0	to	8	10	0
Tannic, commercial.....	lb.	0	3	0	to	0	3	6
Tartaric	lb.	0	1	4	to	0	1	5
Alum, lump.....	ton	12	10	0	to	13	0	0
Alum, chrome.....	ton	37	10	0	to	40	0	0
Alumino ferric.....	ton	9	0	0	to	9	10	0
Aluminium, sulphate, 14-15%.....	ton	12	0	0	to	13	0	0
Aluminium, sulphate, 17-18%.....	ton	15	0	0	to	16	0	0
Ammonia, anhydrous.....	lb.	0	1	10	to	0	2	0
Ammonia, .880.....	ton	35	0	0	to	37	0	0
Ammonia, .920.....	ton	22	0	0	to	24	0	0
Ammonia, carbonate.....	lb.	0	0	4	to	—	—	—
Ammonia, chloride.....	ton	60	0	0	to	65	0	0
Ammonia, muriate (galvanisers).....	ton	45	0	0	to	47	10	0
Ammonia, nitrate	ton	55	0	0	to	60	0	0
Ammonia, phosphate.....	ton	90	0	0	to	95	0	0
Ammonia, sulphocyanide.....	lb.	0	3	0	to	—	—	—
Amyl acetate	ton	150	0	0	to	160	0	0
Arsenic, white, powdered.....	ton	42	0	0	to	44	0	0
Barium, carbonate, 92-94%.....	ton	12	10	0	to	13	0	0
Barium, Chlorate	lb.	0	0	11	to	0	1	0
Chloride	ton	12	0	0	to	12	10	0
Nitrate	ton	40	0	0	to	42	0	0
Barium Sulphate, blanc fixe, dry.....	ton	26	0	0	to	28	0	0
Sulphate, blanc fixe, pulp.....	ton	16	0	0	to	16	10	0
Sulphocyanide, 95%.....	lb.	0	1	6	to	0	1	0
Bleaching powder, 35-37%.....	ton	14	0	0	to	—	—	—
Borax crystals.....	ton	31	0	0	to	32	0	0
Calcium acetate, Brown.....	ton	8	0	0	to	9	0	0
Grey	ton	10	0	0	to	11	0	0
Calcium Carbide.....	ton	22	0	0	to	23	0	0
Chloride	ton	8	10	0	to	9	0	0
Carbon bisulphide	ton	60	0	0	to	62	0	0
Casein, technical.....	ton	85	0	0	to	90	0	0
Cerium oxalate.....	lb.	0	3	6	to	0	3	9

	Per	£	s.	d.	to	£	s.	d.		Per	£	s.	d.	to	£	s.	d.
Chromium acetate.....	lb.	0	1	1	to	0	1	3	Benzyl chloride, technical.....	lb.	0	2	0	to	0	2	3
Cobalt acetate.....	lb.	0	11	0	to	0	11	6	Betanaphthol benzoate.....	lb.	0	5	9	to	0	6	0
Oxide, black.....	lb.	0	10	6	to	0	11	0	Betanaphthol.....	lb.	0	2	0	to	0	2	2
Copper chloride.....	lb.	0	1	3	to	0	1	6	Betanaphthylamine, technical....	lb.	0	7	0	to	0	7	3
Sulphate.....	ton	29	10	0	to	30	10	0	Croceine Acid, 100% basis.....	lb.	0	3	6	to	0	3	9
Cream Tartar, 98-100%.....	ton	120	0	0	to	125	0	0	Dichlorobenzol.....	lb.	0	0	9	to	0	0	10
Epsom salts (<i>see</i> Magnesium sulphate)									Diethylaniline.....	lb.	0	3	0	to	0	3	6
Formaldehyde 40% vol.....	ton	82	0	0	to	85	0	0	Dinitrobenzol.....	lb.	0	1	5	to	0	1	6
Formusol (Rongalite).....	lb.	0	3	9	to	0	4	0	Dinitrochlorobenzol.....	lb.	0	1	3	to	0	1	4
Glauber salts, commercial.....	ton	5	5	0	to	5	10	0	Dinitronaphthalene.....	lb.	0	1	6	to	0	1	8
Glycerine, crude.....	ton	70	0	0	to	72	10	0	Dinitrotoluol.....	lb.	0	1	8	to	0	1	9
Hydrogen peroxide, 12 vols.....	gal.	0	2	8	to	0	2	9	Dinitrophenol.....	lb.	0	2	9	to	0	3	0
Iron perchloride.....	ton	30	0	0	to	35	0	0	Dimethylaniline.....	lb.	0	3	3	to	0	3	6
Iron sulphate (Copperas).....	ton	4	0	0	to	4	5	0	Diphenylamine.....	lb.	0	4	6	to	0	4	9
Lead acetate, white.....	ton	42	10	0	to	45	0	0	H-Acid.....	lb.	0	6	6	to	0	7	0
Carbonate (White Lead).....	ton	44	0	0	to	47	0	0	Metaphenylenediamine.....	lb.	0	5	6	to	0	5	9
Nitrate.....	ton	48	10	0	to	50	10	0	Monochlorobenzol.....	lb.	0	0	10	to	0	1	0
Litharge.....	ton	35	10	0	to	36	0	0	Metanilic Acid.....	lb.	0	6	6	to	0	7	0
Lithopone, 30%.....	ton	26	0	0	to	27	0	0	Monosulphonic Acid (2.7).....	lb.	0	7	0	to	0	7	6
Magnesium chloride.....	ton	12	0	0	to	13	0	0	Naphthionic acid, crude.....	lb.	0	3	9	to	0	4	0
Carbonate, light.....	cwt.	2	10	0	to	2	15	0	Naphthionate of Soda.....	lb.	0	4	0	to	0	4	3
Sulphate (Epsom salts com- mercial).....	ton	9	10	0	to	10	0	0	Naphthylamin-di-sulphonic-acid..	lb.	0	4	9	to	0	5	0
Sulphate (Druggists').....	ton	15	10	0	to	17	10	0	Nitronaphthalene.....	lb.	0	1	4	to	0	1	5
Manganese, Borate.....	ton	70	0	0	to	75	0	0	Nitrotoluol.....	lb.	0	1	3	to	0	1	4
Sulphate.....	ton	70	0	0	to	75	0	0	Orthoamidophenol, base.....	lb.	0	15	0	to	0	18	0
Methyl acetone.....	ton	85	0	0	to	90	0	0	Orthodichlorobenzol.....	lb.	0	1	1	to	0	1	2
Alcohol, 1% acetone.....	ton	90	0	0	to	95	0	0	Orthotoluidine.....	lb.	0	2	3	to	0	2	6
Nickel sulphate, single salt.....	ton	65	0	0	to	66	0	0	Orthonitrotoluol.....	lb.	0	0	10	to	0	1	0
Nickel ammonium sulphate, double salt.....	ton	67	0	0	to	68	0	0	Para-amidophenol, base.....	lb.	0	10	0	to	0	10	6
Potash, Caustic.....	ton	34	0	0	to	—			Para-amidophenol, hydrochlor....	lb.	0	10	6	to	0	11	0
Potassium bichromate.....	lb.	0	0	7½	to	—			Paradichlorobenzol.....	lb.	0	0	6	to	0	0	7
Carbonate, 90%.....	ton	31	0	0	to	33	0	0	Paranitraniline.....	lb.	0	4	3	to	0	4	6
Chloride 80%.....	ton	15	0	0	to	20	0	0	Paranitrophenol.....	lb.	0	2	9	to	0	3	0
Chlorate.....	lb.	0	0	6	to	0	0	6½	Paranitrotoluol.....	lb.	0	5	9	to	0	6	0
Meta bisulphite, 50-52%.....	ton	112	0	0	to	120	0	0	Paraphenylenediamine, distilled..	lb.	0	11	6	to	0	12	0
Nitrate, refined.....	ton	45	0	0	to	47	0	0	Paratoluidine.....	lb.	0	7	0	to	0	7	6
Permanganate.....	lb.	0	0	9	to	0	0	10	Phthalic anhydride.....	lb.	0	3	0	to	0	3	3
Prussiate, red.....	lb.	0	2	4	to	0	2	6	Resorcin, technical.....	lb.	0	5	6	to	0	6	0
Prussiate, yellow.....	lb.	0	1	2½	to	0	1	3	Resorcin, pure.....	lb.	0	7	6	to	0	7	9
Sulphate, 90%.....	ton	20	0	0	to	22	0	0	Salol.....	lb.	0	2	3	to	0	2	5
Salammoniac, firsts.....	cwt.	3	5	0	to	—			Sulphanilic acid, crude.....	lb.	0	1	4	to	0	1	6
Seconds.....	cwt.	3	0	0	to	—			Tolidine, base.....	lb.	0	6	6	to	0	7	0
Sodium acetate.....	ton	26	0	0	to	27	0	0	Tolidine, mixture.....	lb.	0	2	6	to	0	2	9
Arsenate, 45%.....	ton	45	0	0	to	48	0	0									
Bicarbonate.....	ton	10	10	0	to	11	0	0									
Bichromate.....	lb.	0	0	6	to	—											
Bisulphite, 60-62%.....	ton	25	0	0	to	27	10	0									
Chlorate.....	lb.	0	0	4½	to	0	0	4½									
Caustic, 70%.....	ton	24	0	0	to	24	10	0									
Caustic, 76%.....	ton	25	10	0	to	26	0	0									
Hydrosulphite, powder, 85%.....	lb.	0	2	3	to	0	2	6									
Hyposulphite, commercial.....	ton	15	0	0	to	16	0	0									
Nitrite, 96-98%.....	ton	37	10	0	to	40	0	0									
Phosphate, crystal.....	ton	22	10	0	to	23	10	0									
Perborate.....	lb.	0	1	4	to	0	1	6									
Prussiate.....	lb.	0	0	8½	to	0	0	9									
Sulphide, crystals.....	ton	15	0	0	to	17	0	0									
Sulphide, solid, 60-62%.....	ton	24	10	0	to	25	10	0									
Sulphite, cryst.....	ton	15	0	0	to	16	0	0									
Strontium carbonate.....	ton	80	0	0	to	85	10	0									
Strontium Nitrate.....	ton	70	0	0	to	72	10	0									
Strontium Sulphate, white.....	ton	7	10	0	to	8	10	0									
Sulphur chloride.....	ton	41	0	0	to	42	0	0									
Sulphur, Flowers.....	ton	13	0	0	to	14	0	0									
Roll.....	ton	13	0	0	to	14	0	0									
Tartar emetic.....	lb.	0	1	6	to	0	1	7									
Tin perchloride, 33%.....	lb.	0	1	2	to	0	1	4									
Tin perchloride, solid.....	lb.	0	1	5	to	0	1	7									
Protochloride (tin crystals).....	lb.	0	1	5	to	0	1	6									
Zinc chloride, 10½ Tw.....	ton	21	0	0	to	22	10	0									
Chloride, solid, 96-98%.....	ton	35	0	0	to	40	0	0									
Oxide, 99%.....	ton	36	0	0	to	37	0	0									
Dust, 90%.....	ton	47	10	0	to	50	0	0									
Sulphate.....	ton	21	10	0	to	22	10	0									

Coal Tar Intermediates, &c.

	Per	£	s.	d.	to	£	s.	d.
Alphanaphthol, crude.....	lb.	0	3	0	to	0	3	3
Alphanaphthol, refined.....	lb.	0	3	6	to	0	3	9
Alphanaphthylamine.....	lb.	0	2	0	to	0	2	3
Aniline oil, drums extra.....	lb.	0	1	0	to	0	1	1
Aniline salts.....	lb.	0	1	1	to	0	1	2
Anthracene, 40-50%.....	unit	0	0	8½	to	0	0	9
Benzaldehyde (free of chlorine)...	lb.	0	3	9	to	0	4	3
Benzidine, base.....	lb.	0	5	6	to	0	5	9
Benzidine, sulphate.....	lb.	0	5	6	to	0	5	9
Benzoic acid.....	lb.	0	1	10	to	0	2	0
Benzoate of soda.....	lb.	0	1	9	to	0	1	11

Physical Chemistry in Schools

SIR ERNEST RUTHERFORD was on Wednesday elected president of the Science Masters' Association, which concluded its annual meeting at the Imperial College of Science and Technology, London, on that day. Speaking on "Physical Chemistry in Schools," Brigadier-General H. B. Hartley said the time had come when generalisations on physical chemistry should be incorporated into the main body of chemistry. Professor Philip agreed that physical chemistry in schools should not be an additional subject, but rather a point of view.

Spanish Mercury Contract

THE Ministry of Finance, Madrid, states that the contract concluded with a London company for the sale on a commission basis of the mercury extracted from the Arrayanes and Almaden mines belonging to the State lapsed on December 31 last. According to this statement the board of management of the two mines will alone control the future sales of mercury and will have full power to enter into agreements with other centres of production of mercury for the fixing of a minimum price for a period not exceeding six months.

New Directors of English Oilfields, Ltd.

At the adjourned general meeting of ENGLISH OILFIELDS, LTD., held on Wednesday at the River Plate House, London, E.C., Captain H. Riall Sankey was re-elected a director of the company. Sir H. S. Foster, and Mr. W. G. Pell were elected directors, the former to fill the vacancy caused by the resignation of Major-General Sir G. Scott-Moncrieff, and the latter to fill the vacancy caused by the resignation of Sir James Heath.

Cement Works for Disposal

TENDERS are invited by January 24 for the DREADNOUGHT PORTLAND CEMENT WORKS at Barrington, Cambridgeshire. The works occupy a site of about 151 acres. Full particulars, reports on borings, &c., may be obtained from Messrs. Robinson & Roods, 37, Bedford Row, London, and tenders should be delivered to the Senior Official Receiver, 33, Carey Street, London, W.C.I.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.

GLASGOW, WEDNESDAY, JANUARY 4, 1922.

Factories being still closed for the New Year holidays, there is little of special interest to report.

The New Year has opened, however, with signs of improving home trade. The export trade will continue in small dimension until something happens to restore credit and confidence in overseas markets.

German offers of chemicals are not so numerous or as favourable in price as they were.

Alkalis and chlorine products are weak on recent reductions in salt, limestone, and coal values, railway rates, and wages.

In coal tar products, owing to coke ovens being out of commission, benzol is in short supply, and the level of price relatively too high.

Some wood distillation products, notably acetone, look like advancing owing to increased demand.

Aniline oil and aniline salt have had a sharp break.

Industrial Chemicals

ACETONE.—The market is short and prices very firm at £72 to £75 per ton for bulk business.

ACID: ACETIC.—Fair business passing, especially for glacial, now a Key Industry product, around £50 per ton.

ACID: CARBOLIC.—Some large parcels of ice crystals, 39/40 per cent., have been disposed of ex stocks, at 5d. per lb. ex works for export.

ACID: NITRIC.—Lower prices are being accepted. Norway is canvassing for orders for high strength made from air fixation.

ACID: SULPHURIC.—Association limits are lower, and some contracts for 20 per cent. oleum have been concluded for forward at considerable reductions around £7 10s. per ton, buyers' tanks and drums. For 168° TW business is sought at £7 per ton in sellers' tanks.

AMMONIA: ANHYDROUS.—Small business at reduced prices.

AMMONIA: MURIATE (galvanisers).—Resale parcels still offering at £32 to £34 per ton.

AMMONIA: SULPHATE.—Good sales have been made for forward deliveries at £14 10s. per ton for ordinary 25½ per cent.

ARSENIC.—Better demand and price firm at £40 per ton.

BARIUM: CHLORIDE.—Continent still selling around £13 per ton against £15 per ton for home make.

BARIUM: NITRATE.—Resale parcels still available at £23 per ton.

BLEACHING POWDER 35/37 per cent.—Demand still far short of supply, and small trade doing at reduced price £14 per ton.

BORAX AND BORACIC ACID.—A dull market with unchanged price. Borax crystals, £30 per ton. Boracic acid crystals, £65 per ton.

CALCIUM: CARBIDE.—Fair sales of imported have been made around £18 per ton c.i.f. in anticipation of decision by arbitration now in process as to whether calcium carbide should fall under Key Industry embargo.

CALCIUM: CHLORIDE.—Home prices have been reduced to meet Continental competition at £7 10s. per ton.

SULPHATE OF COPPER.—Small inquiry for export; price £28 per ton.

FORMALDEHYDE, 40 per cent.—Few transactions at £80 per ton. The fact that this is now included under Key Industries should stimulate production in the country.

GLYCERINE.—Small business passing at reduced prices on basis of £75 per ton for crude 80 per cent.

MAGNESIUM: CHLORIDE.—Continent demanding higher prices at £10 per ton.

POTASSIUM: BICHROMATE.—Home makers have reduced price to 7½d. per lb. to meet foreign competition.

POTASSIUM: CARBONATE, 90/92 per cent.—Fair quantities being imported about £25 per ton.

POTASSIUM: CHLORATE, CRYSTALS and POWDER.—Market weak at 6d. per lb.

POTASSIUM: CAUSTIC, 89/90 per cent. SOLID.—Fair business doing in imported manufacture around £30 per ton. Surplus stocks on resale have now been cleared.

POTASSIUM: PERMANGANATE.—This has had a substantial reduction, and is now 10d. per lb. for imported quality.

SALTCAKE.—Values are still receding on poor demand, and may be called £4 10s. per ton f.o.b. in bulk.

SODIUM: BICARBONATE.—A reduction by home makers of 10s. per ton has been intimated to £11 per ton in bags.

SODIUM: CARBONATE (ALKALI 58 per cent.).—Magadi now offering imported in competition, and lower prices likely.

SODIUM: BICHROMATE.—Continent have suspended cheap offers, and some forward contracts for 1922 delivery made at 6d. per lb. for home make.

SODIUM: CAUSTIC.—Demand still slow. For 1922 contracts makers are asking 70/72 per cent., £22 10s.; 76/77 per cent., £24 10s. per ton.

SODIUM: SODA CRYSTALS.—£7 per ton in bags.

SODIUM: CYANIDE.—Market weak and buyers holding off for lower prices; 100 per cent. basis 10½d. per lb.

SODIUM: NITRATE.—Lower prices are being accepted on a stagnant market around £14 per ton ex works.

SODIUM: NITRITE, 99/100 per cent.—Large resale parcels on offer below makers' reduced prices of £35 per ton.

SODIUM: SULPHIDE, 60/65 per cent.—Some business for export has been concluded below £22 per ton ex resale lots.

SULPHUR is in moderate demand. FLOWERS, £12 per ton. ROLL, £11 per ton. ROCK, £6 per ton. SULPHUR THIRDS

ex Government stocks still available at attractive prices, although some large sales have recently been made.

Coal Tar and Wood Distillation Products

ANILINE OIL AND SALT.—Makers are actively competing for the trade, and prices have been reduced to 1s. and 1s. 1d. per lb. respectively.

BENZOL.—Prices above relative values still being paid for the small supplies available, through closing down of coke ovens. 3s. per gallon for 90° and 3s. 3d. for pure being asked and obtained in buyers' tanks.

ACETONE.—New and extended uses are developing and bottom has been reached. Unexecuted orders are on the market at £72 to £75 per ton c.i.f. U.K. port.

BETA NAPHTHOL.—A few transactions have been put through around 1s. 8d. per lb.

DINITROCHLOROBENZOL.—Business has been done for export on basis of 1s. per lb.

NAPHTHALENE.—Very small demand. Resale parcels are available below £14 per ton for refined.

Note.—Owing to very small interest for the present being taken in other materials falling under these classes they are not referred to.

Review of Manchester Chemical Trade

SIR S. W. ROYSE & Co., LTD., of Manchester, in their circular dated December 31, review the trade of the year:—

Business during 1921 has been conducted under exceptional difficulties and few commercial houses can anticipate with satisfaction the results of their year's trading. Hopes of better conditions have been raised from time to time, only to end in disappointment, and, speaking generally, there has really been little recovery from the slump which commenced in the summer of last year and which has affected all trades and all markets. The heavy fall in the values of most goods has rendered necessary readjustments of wages, and business has been paralysed from time to time by industrial disputes, culminating in the great coal strike which terminated at the end of June, after lasting three months.

The second half of the year has been comparatively free from these disturbing factors, but business in the home trade has continued mainly for near delivery, neither manufacturers nor consumers caring to commit themselves far ahead. The German Reparation (Recovery) Act came into force in April and the Safeguarding of Industries Act in October and, though there has been some confusion and delay in the working, the new regulations do not so far appear to have appreciably affected values. Oversea trade has been much hampered by financial stringency and by the course of the foreign exchanges, which in many cases have been most erratic, and from these causes, together with the considerable fall in values abroad, exporters have had to face some heavy losses. Sea freights, with some important exceptions, have been further reduced and still easier rates may soon be looked for.

The costs of inland transport on coal, limestone, &c., have been lowered and it is reasonable to expect concessions on other goods. Some hopes are entertained that affairs generally are becoming more settled and that, with the lower level of prices now ruling, some improvement in business may be looked for in the New Year, especially if the Irish question is out of the way and good results accrue from the Washington Conference.

Tar Products

This market has naturally been considerably affected by the exceptional conditions which have prevailed during the year, and prices have had a consistent downward tendency. Consequently buyers have adopted the safe policy of covering only their immediate needs. The production of benzol having been reduced by the closing down of a large number of coke ovens resulting from slackness in the steel trade, available supplies have been readily absorbed for motor fuel purposes. Prices have declined from 3s. 5d. in January to 2s. 7d. per gallon at the present time, in sympathy with the reduction in the price of petrol. Toluols have been scarce, but the demand has been only moderate. Solvent naphtha has shown an erratic tendency, the price falling from 2s. 9d. in January to 2s. 4d. in May, and, through short supplies and the sudden demands of the waterprooferers for spot lots, advancing to 2s. 8d. in July, since when it has maintained a fairly strong position till quite recently. Creosote has gradually dropped from the beginning of the year, when value was about 1s. 1½d., to the current price of 5½d. per gallon, largely through cessation of oversea shipments. Crude carbolic acid has been lifeless throughout the year and production small, makers finding no inducement at prices ruling. However, with the decline in the price of creosote, it is reasonable to think that makers will find crude carbolic more interesting in the near future. Liquid carbolic has also been quiet throughout the year, although values have remained steady. Naphthalenes have been only in moderate demand, there being more call for the crude than the refined. In pitch, fuel makers both in South Wales and on the Continent were fairly well covered when the year opened, and, with little demand for briquettes and a steady fall in the prices of coal and pitch, were not disposed to make further purchases until expiration of current contracts. Up to the coal strike consumers generally were able to take up some portion of their commitments against contracts, and in addition some small quantities were bought at reduced figures. After the settlement of the coal strike many briquette makers were obliged to close down through absence of demand, and at the same time German pitch was being offered freely on the Continent at prices that English makers were not disposed to compete against, and in the month of October the fall in price was accentuated. Values have latterly hardened, and the prospects for the remainder of the shipping season are better. In sulphate of ammonia the home trade inquiry has been only limited, the reduction in price in July having failed to stimulate business to any extent. A fairly steady trade has, however, been done for export, with more inquiry latterly, and the returns for the eleven completed months show 116,115 tons as compared with 99,613 tons for the same period of 1920. The figures for January-November, 1913, were 295,930 tons.

Heavy Alkalis

Bleaching Powder has been in only poor demand for the home trade during the year, and a considerable reduction in price was made for contract deliveries over the last six months. Some further concessions have been made for next year's contracts. White caustic soda has been in fair inquiry, mostly for export, but has had to meet the competition of outside supplies. Home trade contracts for 1922 consumption are being booked at reduction of £2 per ton for solid and 15s. per ton for liquid. Requirements of ammonia alkali have been only limited, and manufacturers are booking contracts on favourable terms to consumers for delivery over the next five years. The inquiry for bicarbonate of soda and soda crystals has been small. In the eleven completed months the exports of bleaching powder were 7,486 tons, as against 20,096 tons for the corresponding period of 1920. The exports of soda compounds were under half those of last year, the figures being 197,056 tons, value £2,953,257, to end of November this year, as against 408,503 tons, value £6,579,615, for the same period of 1920. Little business has been doing in chlorates of potash and soda, and values have fallen during the year from 9d. and 5½d. to 4½d. and 3½d. per lb. respectively.

Of chemicals, drugs, dyes and colours, the value of the exports from January 1 to November 30 was in 1919 £24,107,702, in 1920 £37,712,796, and in 1921, £17,550,056. The value of the imports for the same period was in 1919 £18,485,534, in 1920 £32,644,196, and in 1921 £11,708,668.

German Chemical Trade Notes

(FROM OUR OWN CORRESPONDENT.)

BERLIN, DECEMBER 26, 1921.

At present expectation is wound up to the highest pitch, and the New Year is anticipated with somewhat mixed feelings. It is presumed that manufacturers of bromine salts intend to amalgamate owing to the shortage of liquid bromine. Traders are realising that the law whereby invoices are filled in in foreign currencies constitutes a check on all export trade. It has been found that this measure cuts both ways, the sudden fall of the dollar from 300 to 180 marks, being a case in point. It is thought that the boom in the tar market will probably continue in view of the conclusion of a treaty with France with respect to deliveries of tar on reparation account. The newest increase in benzole prices, dating from December 3 last, has caused surprise within the dye and pharmaceutical product industries, particularly as a previous advance in prices came into force on October 10. Following quotations were noted during last week in marks per kilogram (d = domestic price; e = export price):—

Acetanilide, 80 mk. d., 82 mk. e. Acetyl-Salicylic Acid, 180 and 200 mk. d., 200 and 245 mk. e. Citric Acid, 230 mk. d. Ammonium Bromide, 58 mk. d., 62 mk. e. Antipyrin (Phenazone), 420 mk. d., 430 mk. e. Aspirin powder, 450 and 475 mk. d. 500 mk. e.; tablets in glass tubes, 15 and 22 mk. each d., 24 mk. each e. Benzaldehyde, 65 mk. d. Caffein, 1,100 mk. d., 1,200 and 1,300 mk. e. Caffeine Salts, 550 mk. d. Camphor, Japan, in plates, 475 mk. d., powdered, 375 mk. d. Cream of Tartar, 98 and 100 %, 95 mk. d. Cumarin, 900 mk. d. Ergot Extract, alcoholic, 3,600 mk. d. Formaldehyde, 30 %, 32 mk. e., 40 %, 42 mk. e. Guaiacol Carbonate, 800 mk. d. Hexamethylene-Tetramine, 130 mk. d. Hydroquinone, 300 mk. d. Iodine, resublimed, 1,900 mk. d. Iodoform, 2,175 mk. d. Menthol, crystallised, 2,300 mk. d., recrystallised, 2,700 mk. d. Phenacetin, 425 mk. d., 475 mk. e. Potassium Bromide, 52 and 53 mk. d., 56 and 58 mk. e. Potassium Iodide, 1,550 mk. d., 1,600 mk. e. Pyramidon, 1,200 mk. d., 1,400 mk. e. Pyramidon Substitute, 1,100 mk. d., 1,250 mk. e. Quinine Hydrochloride, 6,800 mk. d. Salol, 170 mk. d., 190 mk. e. Saponin, 160 mk. d. Sodium Bromide, 52 and 53 mk. d., 56 and 58 mk. e. Sodium Iodide, 1,800 mk. d. Vanillin, 100 % chem. pure, 3,200 mk. d., 3,300 mk. e. Veronal, 700 mk. d., 850 mk. e.

Quotations for industrial chemicals were as follows:—Acetic Acid, 80 %, 14 mk. d., 18 mk. e. Benzoic Acid, 55 mk. d., 60 mk. e. Boracic Acid, 65 mk. d., 70 mk. e. Oxalic Acid, 98 and 100 %, 46 mk. d., 52 mk. e.; powdered, 45 mk. d. Sulphuric Acid, 66%, 5.50 mk. d., 6.50 mk. e. Alum, powdered, 7.75 mk. d., 8.25 mk. e.; in lumps, 9 mk. d., 9.75 mk. e. Alumina Sulphate, 14 and 15%, 6 mk. e., 17 and 18%, 8 and 9 mk. e. Ammonia, 5 and 5.50 mk. d. Ammonium Carbonate, powdered, 15 mk. e.; in lumps, 32 and 34 mk. e. Barium Chloride, crystallised, 8.50 mk. d., 9.50 mk. e. Bleaching Powder, 80%, 6 mk. d., 7 mk. e. Borax, crystallised, 32 mk. d.; powdered, 33 mk. e. Calcium Chloride, 90 and 95%, 4 mk. d., 4.50 mk. e.; 70 and 75%, 3 mk. d., 3.75 mk. e. Copperas, 2.40 mk. d. Copper Sulphate, 98 and 100%, 18.50 mk. d., 19.50 mk. e. Dextrine, light yellow, 14 mk. d. Epsom Salt, 4 and 5 mk. d. Glauber's Salt, crystallised, 1.50 mk. d., 2.30 mk. e. Glycerine, 80 mk. d., 90 mk. e. Lead, Red, 26 mk. d., 32 mk. e. Lead, White, dry powdered, 31 mk. d., 34 mk. e.; in oil, 30 mk. d., 32 mk. e. Lithopone, Red-Seal, 30%, 11 mk. d., 18 mk. e. Magnesium Chloride, fused, 6.50 mk. e. Potassium Carbonate, 96 and 98%, 30 mk. e. Caustic Potash, 88 and 92%, 21 mk. d., 25 mk. e. Caustic Potash Liquor, 50° Bé, 15 and 16 mk. d. Potassium Chlorate, 19 mk. d., 21 mk. e. Potassium Bichromate, 40 mk. d., 42 mk. e. Salt Cake, 3 mk. d., 3.50 mk. e. Soda Ash, 96 and 98%, 6.50 mk. d., 7 mk. e. Caustic Soda, 24 mk. d., 26 mk. e. Soda Crystals, 2.40 mk. d., 3.50 mk. e. Soda Hyposulphite, crystallised, 6.75 mk. d., 9 mk. e. Sodium Salicylate, 100 mk. d. Sodium Sulphide, 30 and 32%, 9 and 10 mk. e.; 60 and 62%, 16 and 18 mk. e. Zinc, White, Red-Seal, 23 mk. d., 36 mk. e.; Green-Seal, 27 mk. d., 40 mk. e. Zinc Oxide, 90 and 92%, 15 and 20 mk. d.

Company News

STEAUA ROMANA CO., LTD.—The accounts from October 12, 1920, to June 30 last show a credit balance of £25,310, subject to income and corporation profits taxes.

NEW TRANSVAAL CHEMICAL CO., LTD.—The directors announce final dividends for the year ended June 30 last of 3 per cent., less tax, on the cumulative first preference shares, and 4 per cent., less tax, on the cumulative "A" preference shares. Holders of share warrants to bearer may present Coupon No. 25 for payment at the office of Messrs. Erlangers, 8, Crosby Square, London, E.C.

LARNE SALT AND ALKALI CO., LTD.—Weatherall and Green, 22, Chancery Lane, London, W.C., have been instructed by the receiver for the debenture holders of Industrial Organisations, Ltd., to offer by auction debentures and shares in the Larne Salt and Alkali Co., Ltd. The shares will be submitted at the Auction Mart on January 10. The shares, which will be offered in one lot, comprise £14, 550 five per cent. debentures and the whole of the 28,000 ordinary shares of £1 each, being the whole of the issued capital.

CHAMPION & SLEE, LTD.—The trading profits for the year to September 30 last, including interest and transfer fees, amounted to £13,703. From this has to be deducted directors' secretary's and auditor's fees £2,072, depreciation to £4,628, leaving £7,003, to which has to be added £3,989 brought in, making £10,992. After paying a dividend on the preference shares, the directors recommend a dividend on the ordinary shares of 7½ per cent. for the year, leaving to be carried forward £1,542. The annual meeting will be held at Cannon Street Hotel on January 9 at noon.

OILFIELDS OF ENGLAND, LTD.—Speaking at the annual meeting held on Monday, Mr. C. E. Best said the company's cash and liquid assets amounted to over £45,000, equal to 19 per cent. of the total issued capital. Their finance was in a sound condition, and he thought they might quite properly congratulate themselves upon their proportionately strong position in this respect.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 33, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

LOCALITY OF FIRM OR AGENT.	MATERIALS.	REF. No.
Madrid	Rock phosphate	575
Montreal	Lithopone and salt-cake.....	552
Peru	Soaps; perfumes; and druggists' sundries	586
Spain	Chemicals; paints; varnishes, &c.	573
Toronto.....	Druggists' sundries, patent medicines, &c.	3

Tariff Changes

SPAIN.—The Board of Trade understands that reports are current in Spain to the effect that the Spanish Government propose to bring a revised Customs Tariff into force on January 20, in place of the provisional tariff at present in operation. No information is at present available as to how far the new tariff will embody the proposals of the draft tariff published in July last. British exporters should bear in mind the possibility that the new rates may come into force immediately on publication.

Chemical Industry Club Finances

THE Revenue Account and Balance Sheet of the Chemical Industry Club for the year to August 31 last show a surplus of £84 7s. 8d. as against £77 17s. 6d. in the previous year. The income at £1,907 11s. 6d. shows a slight increase on the previous year's figure of £1,905 9s. 6d., while the expenditure at £1,823 3s. 10d. was £50 18s. 5d. more than in the preceding year. The increases under this heading are mainly due to wages, telephone calls, and stationery. The balance sheet, in which no account has been taken of stocks of stationery, &c., on hand, shows the sum of £300 0s. 9d. against cash at bank and in hand.

German Dyes in China

A REPORT issued by the China Section of the Federation of British Industries states that three leading German firms are supplying Chinese merchants with any quantity of dyes they choose to order and are not insisting upon the acceptance of the goods when delivered. They are helped by the present low value of the mark, and the fact that their "chops," or trade marks, are well known to the Chinese. British dye manufacturers, the report says, were hampered in 1920 by the difficulty of obtaining export licences, but while the Germans increased their imports into China during the first five months of 1921, the British trade also showed some comparative increase over the figures for the previous year. British dyes, it is stated, are gaining a high reputation for quality in China, and, if the competitive German prices could be met, would lead the market. A similar state of affairs exists in India, according to Mr. T. A. Ainscough's review of trade in India during 1919-20 and 1920-21, which has been issued by the Department of Overseas Trade. German competition, it states, is at present being most severely met with in aniline and alizarine dyestuffs, and notwithstanding the footing gained by British makers during the war and the excellent distributing organisation which they have built up (which is quite as efficient as the pre-war German organisation) they are being undersold by the imported German article, and—probably largely owing to the exchange—the difference in price in most cases is as much as 40 to 50 per cent. German imports of dyes during recent months have exceeded the British shipments, and it is difficult to find any remedy which our makers can employ in dealing with this difficult situation.

New Year's Honours List

INCLUDED in the New Year's Honours List is a barony for Mr. Joseph Watson, chairman of Joseph Watson & Sons, Ltd., soap manufacturers, for signal services rendered during the war in organising filling factories, and for his great assistance to agriculture through the Agricultural Research Department at Leamington. Professor W. A. Herdman, professor of Oceanography in Liverpool University, and who, after sixteen years' service as general secretary of the British Association, was President of that body in 1920, has received a Knighthood, as has Mr. F. E. R. Becker, who is head of one of the largest groups of paper makers in this country. During the war he conducted a large number of experiments for the Paper Controller, and rendered valuable services in connexion with the wood pulp and paper industries. Sir William Graham, who receives a knighthood, was during the war chairman of the board of management of the Cardiff National Shell Factory and chairman of the boards of management of the Joint National Shell Factories of Cardiff, Newport, Swansea, Llanelly, and Ebbw Vale. Professor C. S. Sherrington, President of the Royal Society, becomes a Knight Grand Cross (G.B.E.) of the Order of the British Empire.

A Metallurgical Chemist's Deal

IN the Mayor's and City of London Court, on Tuesday, before Mr. Registrar Dell, a claim was made by Mrs. Ethel E. Gibbon, 45, Russell Road, Purley, against Mr. James Winnett, metallurgical chemist, 7, Camomile Street, E.C., for £21 7s., money lent. The Registrar said that the defendant in his affidavit stated that when the £20 referred to in the claim was paid to him, it was agreed that he should give plaintiff shares in a dye company, and that it was never intended that he should repay the cash. The dye company had not yet been formed, but as soon as it was and the shares were available they would be allotted or transferred to the plaintiff. For the plaintiff it was stated that the money was lent to be returned, and there was no question about any shares in a dye company. Continuing the witness said that the defendant in the form of receipt gave an undertaking to repay the money out of funds he should receive from a large deal in sugar, or out of a deal in manganese which he was contemplating. Judgment was entered for the plaintiff for the amount claimed, there being no appearance on behalf of the defendant, and an order was made for payment on January 17.

British Empire Exhibition

MR. A. CHASTON CHAPMAN, President of the Institute of Chemistry, will represent the Institute on the Committee of the British Empire Exhibition (1923).

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

London Gazette

Bankruptcy Information

GRAHAM, William, 16 and 18, Gosforth Street, and 88B, High Street, Felling, Durham, drug store proprietor, &c. First meeting, January 10, 11 a.m., official receiver's office, Pearl Buildings, 4, Northumberland Street, Newcastle-upon-Tyne. Public examination, January 26, 11 a.m., County Court, Westgate Road, Newcastle-upon-Tyne.

Order Made on Application for Discharge

ILEY, John Thomas (lately trading as W. H. Iley & Co.), 32, Ryhope Street, Ryhope Colliery, Durham, drug store-keeper, &c. Discharge suspended for six months, and that he be discharged as from June 8, 1922.

Companies Winding Up Voluntarily

BRITISH SUGAR CO., LTD. John Morris, 12, King Street, Liverpool, company secretary, appointed liquidator. Meeting of creditors at 12, King Street, Liverpool, Tuesday, January 17, 1922, at 11 a.m. Particulars of claims to the liquidator.

LIVERSEDGE AND COCK, LTD. Mr. J. J. Harrison appointed liquidator.

MOORE & HOLE, LTD. Mr. Hugh Trenchard, 50-51, Lime Street, E.C. 3, appointed liquidator. Meeting of creditors at 50-51, Lime Street, London, E.C. 3, January 11, 1922, at 12.30 p.m.

County Court Judgments

[NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.]

BLUNT, W. H., & SON, 70, Snow Hill, Birmingham, chemists. £16 1s. October 26.

DODDS DRUG STORES, 35, Hampstead Road, N.W., chemists and druggists. £10 17s. 9d. October 25.

LUBOIL, LTD., 9, Copthall Avenue, oil merchants. £11 13s. 6d. October 28.

STEWART, J. D., 100, Richmond Road, Earl's Court, S.W., chemist. £16 14s. 4d. November 2.

TURNER, Walter and Norman, 67, Devonshire Road, Westbury Park, Bristol, druggists, and another, trading as Turner & Woodward. £65 19s. 4d. October 21.

Bill of Sale

[The undermentioned information is from the Official Registry. It includes Bills of Sale registered under the Act of 1882 and under the Act of 1878. Both kinds require re-registration every five years. Up to the date the information was obtained it was registered as given below; but payment may have been made in some of the cases, although no notice had been entered on the Register.]

NICOL, John Frederick, 194, Westbourne Grove, Bayswater, chemist. £50. December 30.

Mortgages and Charges

[NOTE.—The Companies Consolidation Act, of 1908, provides that every Mortgage or Charge, as described therein, created after July 1, 1908, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges which would, if created after July 1, 1908, require registration. The following Mortgages and Charges have been so registered. In each case the total debt, as specified, in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced since such date.]

CYPRUS SULPHUR & COPPER CO., LTD. (late NEW LYMNI, LTD.), London, E.C. Registered December 21, £20,000 first debentures (filed under sec. 93 (3) of the Companies (Consolidation) Act, 1908), present issue £2,600; general charge. *— June 20, 1921.

GOADSBY & CO., LTD., Manchester, paint manufacturers. Registered December 21, mortgage to London Joint City and Midland Bank, Ltd., securing all moneys due or to become due to the bank; charged on land, works, &c., at Cross Street and Queen Street, Bradford, Manchester. *Nil. January 6, 1921.

MANN & COOK (WEST AFRICA), LTD., London, E.C., general merchants. Registered December 14 (by order on terms), assignment securing £590 11s. 8d. to R. B. Petre, 11, Ironmonger Lane, E.C., tr. of, &c.; charged on debt due to the company from firm of Mann & Cook, and all dividends payable in respect thereof. *— January 4, 1921.

NASH (F. J.), LTD., Newtown (Montgomeryshire), chemists. Registered December 26, £530 7s. 3d. debenture, to A. G. Eccleston, Whitchurch, sol.; general charge. *£500. January 27, 1921.

PEGG & ELLAM JONES, LTD., Derby, paint manufacturers. Registered December 16, £600 debentures part of £5,000; general charge. *£1,500. July 28, 1920.

New Companies Registered

The following list has been prepared for us by Jordan & Sons, Ltd., company registration agents, 116 and 117, Chancery Lane, London, W.C.2:—

ALLAN & HARRY BROWN, LTD., wholesale and retail drysalts, chemists, &c. Nominal capital: £1,000 in 1,000 shares of £1 each. A subscriber: Henry Brown, 42, Elizabeth Street, Nelson.

HARDIE, MILROY, & CO. (LONDON), LTD., 102, Southwark Street, S.E. 1, merchants and drysalts. Nominal capital: £25,000 in 25,000 shares of £1 each.

MARINITE, LTD., Alpha Road, Surbiton, Surrey, manufacturers and producers and dealers in the composition or substance termed "Marinite." Nominal capital: £10,000 in 10,000 shares of £1 each.

Physical and Optical Societies' Exhibition

THE twelfth annual exhibition of the Physical Society of London and the Optical Society was held on Wednesday and Thursday at the Imperial College of Science, South Kensington. L. Oertling, Ltd., of Turnmill Street, London, had a good display of chemical balances, which included a new model which sells at an attractive price. The Cambridge & Paul Instrument Co., Ltd., were showing, among other things, two types of hydrogen ion apparatus, one of which is designed for accurate research work, and the other for ordinary electro-metric titrations. Other features of their display were a disappearing filament pyrometer and a portable CO₂ and temperature indicator. Electro-titration apparatus for use in hydrogen ion concentration measurements, and the preparation of accurately neutral solutions was shown by A. Gallenkamp & Co., Ltd., of Sun Street, Finsbury Square, London. They also had a good display of electric tube, muffle and crucible furnaces and various types of apparatus for physical chemistry experiments. Automatic temperature-control devices were prominent exhibits of the Foster Instrument Co., of Letchworth. The "Resilia" patent wall type indicating pyrometer, which has a scale magnifying device, and is fitted with automatic compensation for cold junction temperature, and the "Resilia" patent portable indicating pyrometer were included in the display. At the stand of Bellingham & Stanley, Ltd., of 71, Hornsey Rise, London, were seen polarimeters, saccharimeters, and refractometers, while Evershed & Vignoles exhibited various indicating instruments for the measurement of current and pressure, and a number of new-pattern recording instruments. A high-power microscope, known as the "Talyden," was seen at the stand of Taylor, Taylor & Hobson, Ltd., of 74, Newman Street, London. Primarily designed for measuring Brinell depressions, it can be used for measuring small marks or objects which come within its range. An instrument for determining within small limits of error the outside diameters of small manufactured parts was also shown. George Kent, Ltd., of 199, High Holborn, London, displayed their pressure-corrected steam-flow recorder which, being of the diagram type, gives a graphic reading of the variations in the flow during the twenty-four hours. Adam Hilger, Ltd., of 75a, Camden Road, London, were showing apparatus for the study of physical properties of glass, and the Lea Recorder Co., Ltd., of 28, Deansgate, Manchester, exhibited the Lea patent indicating, recording and integrating apparatus.

